



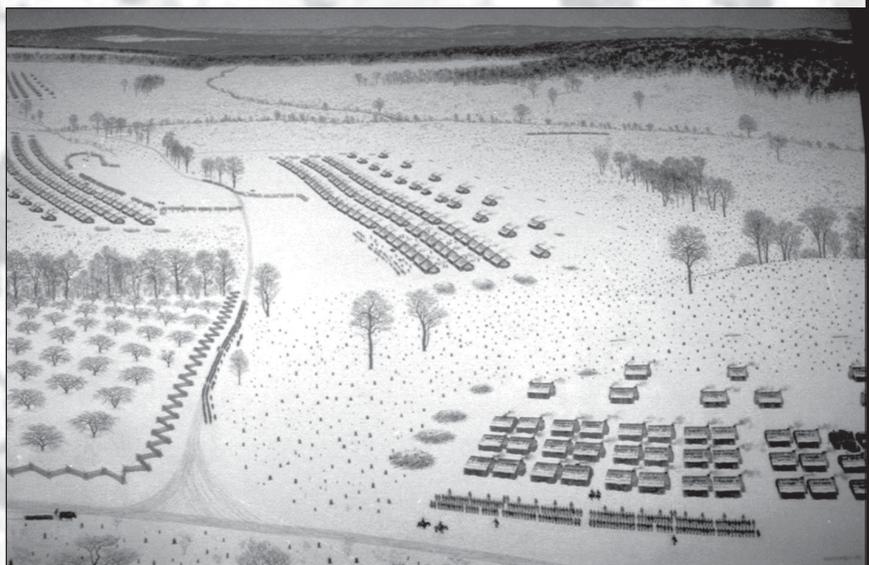


## CHAPTER 3: AFFECTED ENVIRONMENT

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*A network of roads connected the main body of the army with strategically located outlying units and General Washington in Morristown. Troops assembled on a central parade ground in Jockey Hollow. Most main roads and some camp roads built by the soldiers remain today.*



## CHAPTER 3: AFFECTED ENVIRONMENT

### INTRODUCTION

This section is divided into five main sections: Cultural Environment, Natural Environment, Visitor Experience, Park Operations, and Socioeconomic Environment. The information is drawn from diverse sources listed in the bibliography.

#### I. LOCATION

The park is comprised of 1,697.55 acres situated in north central New Jersey, approximately 30 miles west of New York City. The park contains four geographically separate units, each of which are associated with the Revolutionary War winter encampments of the Continental Army.

#### II. UNITS

The park is comprised of four units as follows:

- *Washington's Headquarters* (approximately 10 acres), located in the town of Morristown, contains the Ford Mansion (1772), which served as General George Washington's headquarters during the winter of 1779–80. The house is furnished and open to the public. The adjacent museum, completed in 1937, houses the park's extensive collections of Revolutionary War materials, archives, and artifacts, serves as the park's administrative office, and functions as the main visitor contact station for the park.
- *Fort Nonsense* (approximately 35 acres) encompasses a prominent hill approximately 1 mile west of Washington's Headquarters overlooking the town of Morristown. Here the soldiers dug trenches and raised embankments in 1777 on the orders of General Washington, who wanted the strategic crest fortified. Visitors enjoy long views from the hilltop and see the footprint of the Upper Redoubt traced in small granite blocks.
- *Jockey Hollow* (approximately 1,330 acres), lying approximately 3 miles southwest of Fort Nonsense, is the site of the "log-house city" constructed by some 10,000 troops during the



*The orchards yielded a bounty of apples for cider-making, cooking, and eating. Photo by Staples and Charles.*

severe winter of 1779–80. The Grand Parade field, and the farmsteads of Henry Wick and Joshua Guerin, are also in the unit. The landscape consists of rolling hills covered with a mixed hardwood forest. Visitor services include the restored Wick House, re-creations of several soldiers' huts, a visitor center, parking lots, numerous hiking trails, and a one-way loop road.

- *New Jersey Brigade* (approximately 321 acres) preserves the site of the encampment of 1,000 troops from the New Jersey Brigade in 1779–80. Principally rolling hills supporting a mixed hardwood forest, it is located about 1 mile southwest of the main encampment area at Jockey Hollow. The former Cross Estate is also part of

the unit. Several buildings are used for park operations, and the formal garden is open to the public.

## CULTURAL ENVIRONMENT

### *I. HISTORIC AND DESIGNED LANDSCAPES*

The historic and designed landscapes are among the park's most vital resources. These landscapes, when combined with the historic structures, archeological resources, and museum collections and archives, are essential in relating the park's significant stories. The relative absence of historic structures in all but the Washington's Headquarters unit places a greater burden on the landscapes in conveying these stories.

The hills, ridges, streams, roads, fence lines, farmsteads, and woodlots were the settings and contributing factors for the significant episodes of the park's history. Natural and human processes have altered many of these features. For example, numerous unused farm fields have become wooded over the years, and the size and configuration of fields, orchards, and woodlots have changed. Decades of routine maintenance have perpetuated the appearance of much of the park from the 1930s.

The steady spread of nonnative invasive plants, coupled with increased deer browse, is diminishing the historic character of the park. For example, historic roads and trails are being engulfed by vines, and native understory vegetation is absent in many forested areas, having been replaced by nonnative shrubs and vines. There is a strong possibility that the continuation of these processes threatens the very survival of the forest. The resulting landscape of vines, dead and dying trees, and nonnative shrubs, would not resemble the encampment period (or later commemorative era) in any aspect except for the lack of canopy trees in cantonment areas.

The historic integrity of cultural resources, including landscapes, as defined in National Register Bulletin #30, determines the authenticity of a site's identity, evidenced by the survival of physical characteristics that existed during the site's historic period. Often a subjective judgment, the evaluation of integrity must be grounded in an understanding of the site's physical features and characteristics and how they relate to its significance. The National Register employs seven aspects, or qualities, that in various combinations, define integrity: location, design, setting, materials, workmanship, feeling, and association. All seven aspects need not be present for eligibility, as long as the overall sense of past time and place is evident. Under this definition, a landscape can have integrity to more than one period of significance.

The park identifies three historic landscapes: Washington's Headquarters, Fort Nonsense, and Jockey Hollow/New Jersey Brigade. The Wick Farm and Cross Estate are component landscapes of Jockey Hollow/New Jersey Brigade.

#### **Washington's Headquarters**

The most important aspect of the unit that remains today is the Ford Mansion, with its formal appearance facing the road. Also contributing to the site's Revolutionary War significance are the semicircular drive and open lawn with large, scattered shade trees fronting Morris Avenue. Many features added to the site after the 18th century do not contribute to its significance. These include the pedestrian paths around the grounds, the museum, parking area, and neighboring structures. The existence of I-287 along the site's west boundary and the substantial suburban development on all sides of the property greatly diminish its integrity.

The Headquarters unit retains many features that contribute to the commemorative era. These include the Ford Mansion, circular drive, open lawn with scattered shade trees, and museum. No trees remain

that date to the encampment period. While its surroundings have changed, the character of the park property around the mansion remains much as it was during the 1930s. The axial relationship of the Ford Mansion and museum, and the siting of the support and administration facilities, are the only character-defining features from the commemorative era's spatial organization to remain. Views are cluttered and interrupted, and no longer retain the formal design intent. It is likely that the majority of the site's vegetation dates from the 1930s design or later. There are few character-defining features remaining from the 1930s landscape. These include five trees that lined the axial path to the museum and a screen of Norway spruce trees planted by the WANJ to screen the Dick House. The arrival of visitors to the Washington's Headquarters unit has been completely rerouted from that prevailing in the 1930s design. The museum and Caretaker's Cottage, as an element of the designed landscape, also contribute to the commemorative era.

#### **Fort Nonsense**

The Fort Nonsense unit landscape remains a contributing resource in relation to the encampment period of significance and later commemorative era. The site retains integrity to both. The primary elements of the site during the encampment were the fort, the topography, and the views of the surrounding landscape. While the above-ground remains of the fort are gone, the topography and views are intact. The primary elements of the site during the commemorative era were the topography, views, park road, stone monument, and archeological value of the fort site. Although alterations have taken place, such as tree growth, these elements remain. The unit continues to convey its purpose as a passive recreation and interpretive area.

#### **Jockey Hollow and New Jersey Brigade**

Overall, there is a moderate level of integrity to the Jockey Hollow and New Jersey Brigade encampment areas. The landscape that exists today has very

little overall resemblance to its appearance during the encampments. No trees remain that date to the encampment period and the character of the forest has changed in several areas. However, many features that existed during the encampment are present today. They include historic roads, encampment remains, structures, and elements of the vegetation, streams, and spatial organization including strategic views from Mount Kemble to the east. These features combine to allow these areas to represent only two of the seven aspects of historic integrity: location and materials.

For the theme of commemoration, there is a high level of overall integrity in the Jockey Hollow encampment area. The landscape that exists today continues to represent its overall condition during the 1930s. Many changes have taken place and improvements to park facilities made, but the landscape continues to reflect its 1930s appearance. For this later era, Jockey Hollow represents six of the seven aspects of integrity; only the aspect of setting has been diminished since the 1930s. The setting has been diminished by more modern residential development that now surrounds the unit.

#### **Wick Farm**

The Wick Farm is an important component landscape of Jockey Hollow. It is the only one of three farms that were present during the encampment period that retains its identity as a farm. Consisting of approximately 20 acres of the original 800-acre farm, it includes the house, orchard, garden, and several reconstructed outbuildings.

The farm has high integrity of location, association, and setting to the encampment period, because the physical elements of the surrounding environment are relatively the same. The farm has moderate integrity of feeling. Features such as parking and walkways have been added, and the transition to a public space has created the appearance of a well-manicured park. However, the site has avoided

development, and the surrounding fields, orchard, and forest add to the feeling. The two main features, the house and orchard, contribute to a high integrity of workmanship. Overall integrity of design and workmanship is low, due to the loss of buildings, structures, vegetation, and circulation elements, and the addition of later vegetation and circulation.

The Wick Farm retains moderate to high levels of all aspects of integrity to the commemorative era. Many elements constructed or altered as a result of the commemorative era remain, such as the herb garden, despite some later alterations.

*The Orchard:* A fenced-in cider orchard is an important feature within the landscape of the Wick Farm. Its primary contribution lies in the fact of its documented existence since the late 18th century. It reflects the historic character of various time periods in its extant physical attributes and composition, including the varieties grown, as well as pruning style, trunk length, spacing of individual trees, and groundcover. Specifically, it presents elements of the commemorative era through its planting pattern and preservation of historic apple varieties, including “Westfield Seek No Further” and “Early Harvest.” Some of the trees planted by the CCC during the 1930s may still exist.

### **Cross Estate**

A component of the Jockey Hollow/New Jersey Brigade historic landscape, the Cross Estate (begun circa 1902) contains extensive landscaped grounds with several large specimen trees and a walled English country garden with a large pergola. Designed by Julia Newbold Cross and local landscape architect Clarence Fowler, the garden encloses a mountain laurel allée, and collections of native grasses and hollies. The New Jersey Historic Garden Foundation assists the NPS with maintenance of the gardens. The Cross Estate landscape is not significant to either the encampment period or the commemorative era.

## **II. BUILDINGS AND STRUCTURES**

The park contains a number of buildings and structures that contribute to its historic significance:

### **Ford Mansion**

Built between 1772 and 1774 in the Georgian style, the Ford Mansion was one of the grandest homes in the Morristown area. The house, consisting of a large, rectangular main block with a smaller rectangular wing, was built by Jacob Ford, Jr. (1738–76). Ford, a militia officer, died from illness contracted during the 1776 campaign. The mansion achieved its greatest fame during the period December 1779 through June 1780, when George Washington made it his military headquarters. It remained in the Ford family until 1873, when it was acquired by men who in the following year formed the Washington Association. This was a notable early success of the historic preservation movement. The NPS performed a major restoration of the mansion in 1939–40. It is listed on the National Register.

### **Museum**

The museum was constructed in 1935–37 under the Public Works Administration to a design by the firm of John Russell Pope, a noted Colonial Revival architect. Pope’s master plan called for a main building flanked by smaller pavilions connected by arcades, the whole recalling George Washington’s complex at Mount Vernon and creating a formal, symmetrical relationship with the Ford Mansion.

Several elements of Pope’s plan were constructed, but only the 21,000-square-foot main building was built. Problems with contracting and land acquisition caused the pavilions (two stories containing approximately 2,000 square feet each) and arcades to be omitted. However, NPS records indicate that “the plan of adding the wings [pavilions] to the structure as originally planned would not be abandoned, even though it is found impossible to erect them now. If the whole unit is not completed at this time, the remaining portions will be added at the first oppor-

tunity” (HSR 2002). The Historic Structures Report continues, “Unfortunately, but predictably, circumstances and history intervened and the pavilions have never been built. For one familiar with the original design of the building and the historical precedents on which it was based, the museum-library as it was built is stately but somehow incomplete, as if its arms had been chopped off.”

When plans were drawn for the museum addition to house the Lloyd W. Smith collection in the 1950s, the land required to construct the pavilions was still unavailable. Completed in 1957, the addition was tucked relatively unobtrusively into the northwest corner of the museum. In 1975 the museum was substantially remodeled to address outdated mechanical systems, recurring moisture problems, and deferred maintenance issues. The remodel resulted in major alterations to all three floors. Spaces were reconfigured, administrative areas were dispersed, the elevator was removed, and several character-defining features, such as the monumental arched window on the north façade and vaulted ceilings in the auditorium, were lost or obscured.

The museum serves as the park’s main visitor and administrative center. Recent studies identified several deficiencies with the building. The 1999 concept plan for expanding the museum found the building in need of extensive rehabilitation following the two major renovations. These projects greatly compromised the original design of the building, perhaps most importantly shifting the visitor entrance to the rear door. Visitors enter at the lower level and must find their way upstairs and past the library to the front of the building where the main exhibits are located—and where the main doors open to the Ford Mansion. The concept plan also identified a need for approximately 5,000 square feet of space to exhibit objects in the park’s collections currently in storage and host traveling exhibitions, and recommended additional space for a research room, conference room, school groups, a gift shop, and areas to consolidate collections storage.

The 2001 Collections Management Plan determined that substandard environmental controls and space limitations make the museum inadequate for collections storage, although some controls have been improved in the library. Existing storage space suffers from lack of ventilation, control of sunlight and humidity, and fire prevention. The plan recommends an additional 2,120 square feet of climate-controlled space for storage, research, and related work. This might be accomplished within the existing footprint of the building; however, to do so would perpetuate many of the deficiencies identified in the conceptual expansion study.

The building is significant as the first museum constructed for a national historical park, one of the most prominent examples of architecture erected by the PWA, and as a public building designed by the architect John Russell Pope. The museum most likely meets the criteria for listing on the National Register.

#### **Caretaker’s Cottage**

This house, a two-story rectangular-plan frame structure with a gable roof, was built or located on the site by the WANJ in 1886. There is evidence that it may be an older building that was moved to the Ford Mansion grounds at that time. It is managed as a historic structure and serves as the residence for a protection ranger. A small utilitarian, non-contributing garage was added next to the structure in 1963.

#### **Wick House**

The Wick House was constructed c.1750 by Henry Wick, the first farmer in this section of Jockey Hollow. It is a one-and-half-story, rectangular-plan, gable-roofed, frame building erected on a random rubble granite masonry foundation. The house remained in the Wick family until 1871. After being acquired by the NPS, it was thoroughly restored in 1935, under the direction of preservation architect T. T. Waterman. It is listed on the National Register. A number of outbuildings (barn, privy, well head, smokehouse, pigsty, sheep byre, and cow shed)

have been constructed or reconstructed by the NPS. In 1951 the reconstructed barn was razed and the foundation stabilized.

### **Guerin House**

With the Wick House, this is one of two extant farmhouses in Jockey Hollow dating to the encampment period. It is believed to have been constructed in the late 18th century by Joshua Guerin. The house was extensively altered and enlarged in the 19th century. When acquired by the NPS it was severely deteriorated and was thoroughly rehabilitated in 1936–37. It is listed on the National Register and serves as the Superintendent’s residence.

### **Roads and Trails**

Within the park, two historic road traces are considered historic structures: the Old Camp Road, used during the encampment, and the original course of the Mendham–Elizabethtown Road (Tempe Wick Road), cut off after realignment in the 1970s. A portion of Tempe Wick Road has been restored as a heavily used wagon road. Jockey Hollow Road, which bisected the army encampment, was in existence as early as 1767. Maps from the period indicate it was the principal route to Morristown, following the course of modern Western Avenue. Tempe Wick Road is identified as an historic property in the National Register as “Tempe Wick Road—Washington Corners Historic District” (NR No. 00000959). It includes segments of Jockey Hollow and Cemetery Roads. These roads retain integrity of setting, location, association, and feeling.

Also lying within the park, Cemetery Road and Grand Parade Road were constructed in the 1930s to serve visitors. It is not known whether these were built on historic traces.

Several historic roads border the park. Sugar Loaf Road dates to 1776, and retains much of its original alignment and overall integrity despite costly modifications to accommodate park visitors in the 1930s. The park is concerned about increased use of

Sugar Loaf by vehicles associated with the neighboring Delbarton School and commuter traffic. Park visitors have had some difficulty navigating the narrow, curving road when faced with large service vehicles and buses. Bailey Hollow Road was laid out in 1776, but its alignment has been changed somewhat. Basking Ridge Road, now called Route 202 or Mount Kemble Avenue, was one of the most important roads in Morris County, and was repeatedly used by troops during the war. In 1781 the French army under General Rochambeau marched south to Yorktown on this route.

The park contains over 27 miles of trails in the Jockey Hollow and New Jersey Brigade units. They are generally tranquil forest paths with narrow earthen beds. Several cross over small watercourses on rustic bridges. Most were in existence when the NPS acquired the land. Although no research has been completed on the origins of the network, several trails, such as segments of “Patriots Path,” are believed to date to the Colonial period. It is likely that the Continental Army utilized the road system more than trails during the difficult winters at Morristown.

### **Others**

Several small stone monuments dating to the late 19th century are located within the park boundaries. These include monuments to Stark’s Brigade, Fort Nonsense (1888), and the Mutiny of 1781.

The park contains additional structures that do not contribute to the park’s historic significance. The Jockey Hollow Visitor Center, a single-story, brown brick structure built for the Bicentennial in 1976, has some functional shortcomings. Space for fee collection, educational programs, and to support interpretive programs is limited. Other non-contributing structures include the comfort station at the New York Brigade (1976), hut reconstructions at the Pennsylvania Line (last rebuilt in the 1960s), an assortment of small sheds, and a number of houses used as park residences: the Hartshorne House (mid-1800s), the Dick House

(1880s–1900s), Quarters 35 (1965) and the Strolley House (1940s), and the Tuttle Farmhouse (mid-1800s). The assemblage of CCC structures in the utility area, dating to the 1930s, could become eligible for listing on the National Register if an appropriate context were developed.

Similarly, the Cross Estate, probably commenced in 1902 and repeatedly altered, with its numerous outbuildings and ruins, was recommended provisionally for listing on the National Register in 1987. It could be significant at the local level if an appropriate historical context, such as the Country Place, were established. The estate is managed as a cultural resource. Several buildings (main building, chalet, gardener's house, chauffeur's house, and garage) are used as park offices and residences. Its character makes it unsuitable for intensive park uses. Its interior layout is inefficient for administrative purpose, it has limited sanitary facilities (bathrooms and septic system), lacks modern data communication infrastructure, does not comply with ADA standards, and is in a remote residential location, accessed by narrow historic roads that are inappropriate for higher volumes of traffic.

### **III. ARCHEOLOGICAL RESOURCES**

Archeological research at Morristown NHP began soon after the park was established and continued episodically until the close of the 1980s. In accord with the park's mission and purpose, these efforts focused on the encampment period. Generally the objective was to locate or confirm the location of historic resources in order to facilitate structural restoration or reconstruction projects. Insofar as these resources were authenticated, archeology informed interpretation, although that was not its primary purpose.

The emphasis on locating or studying specific features contributed to a fragmented approach, which made it difficult to view the park holistically. Even sites within a cohesive cluster such as the Wick Farm were often examined separately. In addition,

the emphasis on sites and structures came at the expense of examining lifestyle issues, so that archeology did not contribute as fully as it might have to placing Morristown within larger Revolutionary War contexts. In situ resources still remain and have very high potential to yield information about the encampments. This vast resource is still not well understood.

A summary of encampment period resources for specific sites follows:

#### **Ford Mansion**

The grounds contain the remains of many razed outbuildings, wells, and other features. These features have archeological potential to provide information related to the Ford family, the Washington occupation, the 18th- and 19th-century residence, and the later commemorative era. The reported encampment site of Washington's "Life Guard" is just east of Morris Avenue, on private property.

#### **Fort Nonsense**

There are no surface remains of the fort, and the historical accuracy of a fort location here was contested in park records until a 1989 archeological study confirmed that this is indeed the site of historic Fort Nonsense. Despite the bulldozing of the reconstruction that occurred in 1965, the 1989 investigation determined that much of the original Upper Redoubt can still be detected beneath the remains of the reconstruction. In addition, there appear to be areas of the site, particularly on its down-slope periphery, that may be largely undisturbed and retain high potential for data recovery. This could include the site of the suspected Lower Redoubt.

#### **Jockey Hollow**

*New York Brigade:* While this is one of the best-documented encampments in terms of its appearance on Revolutionary War maps and subsequent deeds, today there is no trace of the site. Archeological surveys have uncovered no evidence of the encampment. The area has been the site of a variety

of agricultural, aqueduct-related, and park-related disturbances, any of which may have had a negative impact on the site's integrity. Despite meticulous previous work, the possibility remains that the site has not yet been detected.

***First and Second Pennsylvania Brigades—The Pennsylvania Line:*** The site has been under cultivation since the Revolutionary War, either as field crop or orchard. It is likely that the upper reaches of the site are least disturbed. Some hut sites were identified in the 1930s and in 1961. These were largely destroyed in the course of construction of replica huts. In sum, very little remains on the surface of this large encampment, and it is likely that archeological features are highly disturbed.

***Stark's Brigade:*** An archeological survey in 1967, soon after the NPS acquired the site, found evidence of huts. A farm road and cultivation have reportedly disturbed many features within this encampment, but the extent of disturbance is unknown and many features may remain.

***First and Second Maryland Brigades:*** These encampments remained visible and known into the late 19th century. While the site is generally suitable for agriculture and appears to be extensively disturbed, archeological investigations suggest that features exist that are related to the encampment. A high potential for data recovery exists.

***Hand's Brigade:*** The location is well established, but all visible traces of the encampment have apparently been erased by cultivation. An earlier archeological investigation found hut features, but the report is confusing, and the extent of disturbance and the potential for data recovery remains unclear.

***First and Second Connecticut Brigades:*** Archeological investigation found these sites to be in an "exceptional state of preservation." The Second Connecticut Brigade site has remained essentially undisturbed since its abandonment in

1780 and retains a high probability of archeological integrity.

***Pennsylvania Division:*** This site relates to the encampment of General Anthony Wayne's division in 1780–81. Plowing has disturbed at least part of the site. Confusion exists between this site and the encampments of the previous winter, and provides an example of the difficulties caused by the complex patterns of troop movements at Morristown.

***Fort Hill:*** Despite the potential importance of this site, it has never been subjected to competent archeological investigation. The site is probably archeologically significant, depending on disturbance, which is thought to be minimal.

***Reputed Hand's Commissary Site:*** By 1936 this area was identified as a "commissary," although no archeological or historical evidence supports this designation. The features in this area, regardless of their eventual interpretation, appear to be in good condition.

***Reputed New Jersey Brigade Encampment:*** This reputed site relates to the 1781–82 encampment, but the site is in question and its attribution remains problematic. The site traditionally identified may be incorrect, and archeological evidence found nearby may indicate the correct site.

#### **Guerin House**

Archeological investigation in the 1930s stripped the soil for a distance of 50 feet around the house and reportedly found the remains of several out-buildings. Visible foundations still exist in this zone. Areas more than 50 feet from the house may still have integrity.

#### **Wick Farm**

Archeological work in the 1930s found several stone features, but those that could be interpreted included only an ice house and a barn. The original barn foundation and other historic features may remain.



*Figure 9: Cultural Resources: Park*



Figure 10: Cultural Resources: Park-Related



*Figure 11: Cultural Resources: Adjacent Land Use*

### **New Jersey Brigade Encampment**

Through confusion with accounts of the 1781–82 encampment, it is only since 1967 that the 1779–80 encampment has been located and recorded. Archeological investigations found abundant evidence to confirm the site identification. At present foot traffic and casual tampering by visitors are harming the site. The remains are at risk.

### **Native American Resources and Resources from Other Periods**

Due to the mandated focus on the period of the Revolutionary War, no formal archeological efforts have been directed toward other time periods. Incidental discoveries have been made in the course of investigating reputed military sites. In the process of testing encampment period sites, several Native American sites were found within the park boundary and one site was located just outside the park boundary near Leddell's Pond. However, these artifacts have not been discussed in reports, nor were any prehistoric site forms recorded. Historic records point to a generally high potential for the discovery of additional small Native American sites in the park. But no Native American archeological sites have been systematically investigated at the park.

In general, archeological resources in the encampment areas are being steadily diminished by surface erosion. Accelerated erosion can be seen along fallen trees. Decaying tree roots and burrowing animals also impact these resources. The lack of forest understory vegetation in some places may be accelerating the rate of soil erosion in the park. This may be adversely affecting archeological sites.

Historical evidence suggests that several sites within park boundaries could provide archeological evidence bearing on the rural economy from the 18th into the 20th centuries. For example, numerous remnants of the National Register–listed Morristown Aqueduct system are found in Jockey Hollow. The New Jersey Brigade area may contain evidence of an early industrial community known as Logtown. At the Cross Estate, the yard areas, dooryards, farmyards, and other features have the

potential to provide information on the Country Place era.

## **IV. COLLECTIONS AND ARCHIVES**

### **Museum Artifact Collection**

The museum artifact collection has been built around a nucleus of artifacts donated to the park by the WANJ in 1933. Most of the original artifacts were associated with George Washington, the Ford family, Colonial America, and the Revolutionary War, but the current collection of over 40,000 objects has a wider range. About 25% of these items were recovered as a result of archeological investigations in the park. Only a small fraction of the collection is exhibited in the museum, Ford Mansion, and Wick Farm. The majority of the collection is kept on the third floor of the museum or stored off site.

### **Museum Archival Collection**

The museum contains collections of books, manuscripts, and reference materials relating primarily to the Colonial and Revolutionary War periods. Since 1933 it has grown to more than 45,000 bound volumes, with nearly 17,500 manuscripts, journals, diaries, account books, letter books, military orderly books, inspection returns, and other documents. In 1958 the NPS added a library wing to the museum to accommodate this growth, particularly the Lloyd W. Smith collection. One of the special collections of value to students of the Revolution is the Lidgeerwood Hessian Transcript Collection. Numbering approximately 21,000 pages of German script and almost 10,000 typescript pages of English transcription, it is the largest collection of translated documents from official German records dealing with the Revolutionary War.

### **Museum Archeology Collection**

A major element in this category is a collection of Native American artifacts that were collected or purchased by Lloyd W. Smith. This collection was estimated to contain approximately 20,000 objects. Due to the way materials were acquired by Smith, little or no provenience data exist for them. The collection also contains between 12,000 and 13,000

artifacts known to have been recovered from within park boundaries or from property adjacent to the park. As they are specific to the park, these objects increase understanding of the park and can contribute to comparative analyses of various kinds.

### **Washingtoniana**

This category includes material such as papers, books, letters, or relics relating to George Washington. This portion of the collection includes excellent examples of clothing, manuscripts and publications about Washington's life and death, portraits of Washington, and weapons worn or used by him.

### **Natural Resource Management Records**

Important files on natural resource management are stored at the Cross Estate. Records include deer management files, environmental assessments, integrated pest management files, orchard and vegetation management files, water quality research and reports.

## **NATURAL ENVIRONMENT**

The park's rich cultural resources are set against diverse and dynamic natural resources. While nature and human activity have shaped Morristown into a cultural landscape, the ecological role of the park in the greater region is still evident. The park remains one of the few large, undeveloped areas in northern New Jersey.

### ***I. CLIMATE***

The Middle-Atlantic region, including New Jersey, is typified by a continental climate, despite the proximity of most of its land to the coast. This is due to the predominance of a westerly airstream, which brings extreme temperatures more typical of a large landmass than of a coastal location.

The average temperature in January ranges from 24 degrees Fahrenheit in the northern part of the state to 34 degrees in the south. In July, the northern counties average around 70 degrees, and the southern parts of the state between 74 and 76 degrees.

Morristown NHP is in the range that averages 26–28 degrees in January, and 72–74 degrees in July.

Nearly all of New Jersey averages over 40 inches of annual precipitation, with the highest amounts in the north central part of the state, which average over 48 inches. The highlands of the north cause lifting and cooling of air masses, resulting in greater precipitation. Morristown NHP averages 46–48 inches of annual precipitation.

### ***II. GEOLOGY AND TOPOGRAPHY***

The park lies at the junction between the Highland and Piedmont physiographic provinces, which trend in a southwest–northeast direction, following both the coastline and the orientation of the Appalachians. The Highlands are a southwestern extension of the New England Uplands, and the easternmost edge of the Appalachians. These hills are comprised of hard crystalline rocks, mostly gneiss, which contains deposits of iron, graphite, and mica. On the eastern side of the uplands, in the area of the park, is an extension of the hills known as the Trowbridge Range, itself part of the Reading Prong. The Piedmont is the downsloping east side of the uplands, which meets softer coastal-plain sediments. Morristown NHP consists of hilly terrain overlooking the plains to the east, with mountains to the north and west. The Ramapo Fault, running southwest–northeast, parallel to Route 202, marks this junction between hills and plains.

Northern New Jersey was the southernmost limit of glacial advance during the Pleistocene era, leaving a terminal moraine that runs across the grain of the uplands, from northwest to southeast. North of the moraine, the glacial valleys were partially filled with debris that resulted in the formation of lakes, while the uplands were scraped bare. South of the moraine, drainages were infused by large amounts of meltwater, creating fertile outwash plains.

The hills in the park are generally between 175 and 215 meters (580–700 ft) in elevation, while the lowest elevations are located along Indian Grove

Brook (known historically as Indian Grave Brook) and the Passaic River, approximately 110 meters (360 ft) in elevation.

The *New Jersey Brigade* unit is comprised of two hills separated by the Passaic River, which runs through the approximate center of the unit. In the southwestern portion is an unnamed hill that is bounded by Indian Grove Brook, and in the north-eastern portion the unit includes a portion of Blachleys Hill. Elevations range from lows of 110 and 116 meters (360–380 ft) along Indian Grove Brook and the Passaic River, to highs of 182 meters (600 ft) on Blachleys Hill and 195 meters (640 ft) on the unnamed hill.

The *Jockey Hollow* unit consists of a small Y-shaped valley or “hollow” formed by two branches of Primrose Brook, surrounded by a series of low hills. The largest of these hills, Sugar Loaf, reaches 230 meters (756 ft) and lies at the northern edge of the unit. The other hills have peaks of between 189 and 213 meters (620–700 ft), and include Tea Hill (195 m) and Mount Kemble (213 m). A few lower terraces are also present in this unit, lying between 165 and 177 meters (540–580 ft). Primrose Brook gently flows north to south, beginning at 115 meters (380 ft) at the northern edge of the unit, and dropping to 112 meters (370 ft) at the southern edge.

Oil, gas, and other mineral industries have made no impact on park resources. The NPS Abandoned Mine Land Inventory indicates the presence of two mines in the Jockey Hollow unit. One is an abandoned mica mine. The other has no sign of mineral material. Several park residences have been measured to have high radon.

The *Fort Nonsense* unit lies on top of the long escarpment, the northeastern extension of Mount Kemble. With a peak of 177 meters (580 ft) at the center of the unit, and a low point of 122 meters (400 ft) at its northeastern edge, Fort Nonsense provides panoramic views to the east.

The *Washington’s Headquarters* unit lies on a low terrace overlooking the Whippany River to the north. I-287 and Lafayette Avenue now lie between the unit and the Whippany River. This unit slopes gradually from 104 meters (340 ft) near the Ford Mansion to 91 meters (300 ft) in elevation at the visitor parking area.

### III. SOILS

Soil in the area of Morristown NHP are classified as follows:

- *Edneyville-Parker-Meckesville*. Deep, moderately well-drained to somewhat excessively well-drained, gently sloping to very steep, gravelly, stony, and rocky soil. These soils are formed on bedrock uplands in the western part of the New Jersey Brigade unit.
- *Edneyville-Parker-Califon*. Deep, excessively drained to somewhat poorly drained, gently sloping to steep, gravelly, and stony sandy loams. These soils formed over granitic gneiss on uplands that are glacial deposits or weathered bedrock in the central and northern part of the Jockey Hollow unit.
- *Parker-Edneyville*. Deep, excessively drained and well drained, steep to very steep, gravelly and sandy loams. These soils also formed over granitic gneiss on uplands of glacial material or weathered bedrock in the western, southern, and eastern parts of the Jockey Hollow unit, as well as in the eastern portion of the New Jersey Brigade unit and the western part of the Fort Nonsense unit.
- *Riverhead-Urban*. Deep, well-drained to somewhat poorly drained, nearly level to strongly sloping, gravelly and sandy loams formed on outwash plains and terraces. These soils include all of the Washington’s Headquarters unit, and the eastern part of the Fort Nonsense unit.

The majority of the park consists of gravelly and rocky soils formed on uplands of bedrock and glacial till. The Parker associated soils have implications for

historical land use, in that they were not particularly suitable for farming, and were better utilized for wood and hunting territory. The Riverhead soils, however, would have been suitable for agriculture.

#### **IV. WATER RESOURCES**

##### **Surface Water**

Significant surface water features in Morristown NHP are found only within the Jockey Hollow and New Jersey Brigade units. These units are largely located within the upper reaches of the 55.6 square-mile Great Swamp Watershed, a subunit of the Upper Passaic River Basin. As such, the park protects major tributaries to the Great Swamp National Wildlife Refuge and important sources of drinking water supply for the region. The park's water resources were important factors in the selection of Jockey Hollow for the winter encampments.

Predominant surface water features within the park include the following:

- Most of the headwaters of the Primrose Brook subwatershed, including 2.5 miles of the East and West Branches, are located in Jockey Hollow. The brooks vary from 3 to 5 feet in width. While most of the springs contributing to Primrose Brook surface within the park near Sugar Loaf and Mount Kemble, the source spring of the East Branch Primrose Brook is found in an area known as Military Hill, located on private land just outside the northeastern boundary of the park.
- The one-quarter-mile-long headwaters of Jersey Brook, a tributary of Primrose Brook, originates from springs in the southwestern portion of the Jockey Hollow unit. It runs roughly parallel to Tempe Wick Road to its confluence with Primrose Brook.
- A one-half-mile reach of the upper Passaic River, varying from 10 to 14 feet in width, arises about 3 miles northwest of the New Jersey Brigade unit. The river passes through areas of relatively low-density residential development, and is impounded at Leddell's Pond about 1 mile before it passes through this unit.

- A one-half-mile section of Indian Grove Brook, a tributary of the Passaic River, approximately 3 to 5 feet in width, arises about 1.2 miles northwest of the New Jersey Brigade unit. The brook runs through an area of low-density residential development as it parallels Hardscrabble Road.

A small artificial pond, Cat Swamp Pond, and two small marshes are also located within the upper Primrose Brook drainage (Ehrenfeld 1977). Cat Swamp Pond is a remnant of the water collection and storage system that was built as part of the Morristown Aqueduct Water System. The pond is surrounded by a construction berm, has no natural drainage, and its water level is maintained by the water table. While the pond has no natural outlet, it is connected to East Branch Primrose Brook by an overflow outlet pipe along the eastern edge of the berm. Another small marsh is found adjacent to Indian Grove Brook within the New Jersey Brigade unit (Ehrenfeld and Dibeler 1987).

##### **Quality**

The park monitors key water quality parameters on a monthly basis at 11 stations. The confluence of the East and West Branches of Primrose Brook is utilized as a water quality monitoring site by several state and federal agencies including the U.S. Fish and Wildlife Service and U.S. Geological Survey. The State of New Jersey, Department of Environmental Protection, Division of Watershed Monitoring, conducts macroinvertebrate sampling on the West Branch of Primrose Brook near the Trail Center parking lot.

Results indicate that the streams within the park generally exhibit very good to excellent water quality, being well oxygenated at all times, neutral in pH, low to moderate in alkalinity, and containing low to moderate nutrient concentrations. Total suspended solids, total dissolved solids, specific conductance, and chlorides, while low in streams, were slightly higher in Jersey Brook, Indian Grove Brook, and the Passaic River than they were in Primrose Brook (Trama and Galloway 1988). Increases in these

parameters may be associated with the close proximity of Tempe Wick Road to Jersey Brook and the low-density residential development found in the uppermost reaches of the Upper Passaic and Indian Grove Brook subwatersheds.

Fecal coliform bacteria levels exceed standards determined by the State of New Jersey Ground Water and Safe Drinking Regulations. In the early 1990s the park closed a public potable water source located at the Pennsylvania Line parking lot due to continual high levels of coliform. An intensive study concluded that contamination is not continuous, occurring seasonally in some streams and occurring throughout the year in others. The source of bacteria found in the water samples of this study is fecal matter from warm-blooded animals. The park does not have any untreated public drinking sources, and there are no official areas for swimming.

Trama and Galloway (1988) reported very low total recoverable aluminum concentrations in the stream water that pose no threat to aquatic life. Further analysis revealed high aluminum content in local soils. While it is unlikely that the aluminum poses a threat to aquatic organisms, in the event that aluminum from the soil was mobilized both water quality and aquatic biota could be impacted.

The water in Cat Swamp Pond is tannin-stained and has a heavy influx of leaf litter and a negligible rate of water exchange.

The New Jersey Surface Water Quality Standards (as amended, May 1998) designate all surface waters of the park as FW2-TP, trout production fresh waters.

Primrose Brook and the section of the Passaic River that flows through the park are also recognized by the state of New Jersey as Category One "Antidegradation" Waters. One of the highest-quality streams within the Great Swamp Watershed, Primrose Brook is the least human-influenced stream within the park (Trama and Galloway 1988).

The high water quality generally found in the streams flowing through the park can be attributed largely to the upper watershed location of the Jockey Hollow and New Jersey Brigade units. No permitted National Pollutant Discharge Elimination System (NPDES) discharges are known to occur into any of the streams above the park.

### **Subsurface Waters**

Aquifers provide the primary water supply to many of the communities around the park. The Precambrian gneiss that underlies the park is fairly impermeable to water but does contain groundwater in scattered locations. Park visitor facilities, administrative buildings, and seven park residences rely on park wells. Both the Jockey Hollow and New Jersey Brigade units contain numerous natural springs and seeps emanating from a shallow aquifer. These provided an important water source to the encamped Continental Army. In the 1890s a growing Morristown began to utilize these natural springs as the public water supply. A series of trenches and ponds were constructed in order to facilitate water collection and storage. Water was conveyed to Morristown via the Morristown Aqueduct. This system was abandoned in 1933, but remnants including iron pipes, collection trenches, vaults, and storage ponds remain. While little information is available regarding current local ground water use, there are no known well fields or other significant withdrawals in the vicinity of the Jockey Hollow and New Jersey Brigade units (Mele 1983).

## **V. BIOLOGICAL RESOURCES**

### **Vegetation**

The vegetation of the Middle-Atlantic region has been in a state of change for many thousands of years. Environmental variables, such as the advance of glaciers, have had a major impact, but even more dramatic is the impact of European settlement over the past four centuries. Forests have been cut for fuel and construction material, and have been cleared for cultivation since the earliest arrival of Europeans in the 17th century. Prior to that time, Native Ameri-

cans also burned forests to clear areas for cultivation, especially along the coastal plains. In recent centuries, marshes and swamps have been filled or drained, to further prepare lands for development. It is therefore difficult to typify a “natural” state of forest.

Paleo-environmental studies indicate that a tundra environment accompanied and followed the advance of the glaciers and was, in turn, replaced by a taiga forest community (Gaudreau 1986; Jacobsen et al. 1987; Watts 1979). Tundra is comprised of low shrubs, sedges, mosses, grasses, flowers, and lichen, and was present only in the northern part of New Jersey at the height of the glacial advance, prior to about 15,000 years ago. Taiga consists mostly of cold-tolerant evergreen conifers with needle-like leaves, such as pine, fir, and spruce. Taiga was dominant in northern New Jersey and southern New York from approximately 15,000 to 8,500 years ago.

In northern New Jersey, it is likely that some hardwood trees became established soon after the retreat of the glacier, brought in the form of seeds that were carried by wind and animals from the south. Hemlock and oak became the dominant forest type from circa 8,500 to 5,000 years ago, with birch, alder, beech, and hickory also present. From approximately 5,000 to 2,500 years ago, oak and hickory were the most common forest species, with chestnut becoming plentiful as well. About 2,500 years ago, chestnut and white, red, and black oak were the most common upland species, with lesser numbers of maple, hickory, elm, and ash, among many other species. Swampland and other lowlands harbored communities of alder and hemlock (Russell 1979:126–132).

Early historical accounts of the Morristown area suggest that in the 18th century, a mesic red oak-chestnut forest covered the lower slopes, a more xeric oak-hickory forest covered the upper slopes, and forest openings vegetated with light-demanding species were common. In the first settlements, circa 1740–50, relatively small areas were cleared. The

1779–80 encampment of the Continental Army cleared some 600 acres of forest for huts and fuel. Similar to the park’s water resources, the forest was an important factor in the selection of Jockey Hollow for the winter encampments. Some of these cleared areas reverted to forest immediately following the war. Most were retained as pasture, orchard, or cropland until the late 1800s. Fields reverted to forest at varying times during the late 19th and early 20th centuries. Ehrenfeld (1977) identified areas of Jockey Hollow that were plowed for cultivation, but there is no specific information about the field and forest pattern before, during, or immediately following the encampments. The establishment of the park in 1933 caused further changes in land use such as abandonment of more fields, efforts to eradicate black locust trees, brush clearing, and planting of white ash trees by the CCC.

#### *Forest*

The forests within the park consist primarily of a mix of native hardwood species, with a lesser number of introduced species. This is common in the Ridge-Valley and Piedmont provinces of New Jersey. The most abundant species are yellow poplar, black birch, and beech. Flowering dogwood is the most common understory species. Red maple, scarlet oak, sugar maple, yellow birch, shagbark hickory, mockernut hickory, white ash, green ash, black walnut, blackgum, hornbeam, black cherry, white oak, red oak, pin oak, black oak, sassafras, and black locust may also be found.

Three forest types have been described in Jockey Hollow: mature, successional, and pure stands. A mature forest type, that was probably never completely cleared for agricultural purposes (56%), consists mostly of mixed oaks. A successional forest type, which has regenerated on agricultural fields abandoned in the 19th and early 20th centuries (27%), consists of a broad mix of species. Pure stands account for approximately 11% of forest cover, the largest stand being 76 acres of yellow poplar. Chestnut, once common, disappeared following the blight of the early 20th century.

The black locust, a non-local species that was utilized by farmers in the 19th and 20th centuries, now exists in successional stands with white ash that were probably planted in the 1930s. These stands include dense patches of vines, primarily a mixture of native grapes and nonnative bittersweet. They typically lack any indication of succession, both where the vines are dense and elsewhere.

The vegetation of the New Jersey Brigade unit consists of a mixture of several types of upland hardwood forest, with varying dominance by yellow poplar, black birch, and chestnut oak, plus a wide range of minor species. Similar conditions exist at Fort Nonsense. However, tree plantings at Washington's Headquarters are principally ornamental in nature, with many fine specimens.

Historical records strongly suggest that when European explorers first arrived, the oak-dominated forests of northeastern North America were open, with little understory. In addition, by the time of the first encampment there were farms within Jockey Hollow, so it is very likely that farmers were grazing their livestock in the forest and using its resources for fuelwood, fencing, and other products. It is thus likely that the mature forest of that time had a relatively open understory.

In the late 1970s, a variety of understory shrubs and small trees were common in the park including flowering dogwood, grape, and spicebush (Ehrenfeld 1977). Speckled alder, witch hazel, gray winterberry, porter blackberry, black raspberry, lowbush blueberry, mapleleaf viburnum, blackhaw, and Tartarian honeysuckle could also be found (Ehrenfeld 1977). The composition of the understory has changed considerably since then, largely through the spread of invasive and exotic plant species.

#### *Invasive and Exotic Plant Species*

At present, invasive nonnative plants dominate the forest understory in parts of all units. The most prevalent nonnative invasive species are the Siebold's viburnum (*Viburnum sieboldii*), wire grass

(*Microstegium vimineum*), Japanese barberry (*Berberis thunbergii*), and oriental bittersweet vine (*Celastrus orbiculatus*). Higher soil pH, nitrification, and populations of exotic earthworms have been found in association with these invasive species. Some changes in use by bird species have been identified as a result of the shift from native understory species to Japanese barberry.

There is concern that the steady spread of non-native species and deer browse may be diminishing the health of the forest ecosystem. Currently, there are very few seedlings of native shrubs or trees surviving in the forest. Thickets of nonnative shrubs and vines are replacing the native vegetation, particularly the understory. While it appears that the exponential growth of nonnative invasive plants is slowing, there is a strong possibility that the continuation of these processes threatens the very survival of the forest. The resulting landscape would be composed of vines, dead and dying trees, and nonnative shrubs.

Several studies involving wildlife exclosures in forested areas are currently being conducted in the park. The objectives are to compare over time the differences in type and structure of vegetation (invasive species, native seedlings, jack-in-the-pulpit, and native wildflowers) with and without deer browsing. The vegetation inside the exclosures and adjacent unfenced control plots are sampled on a yearly basis. Seedling plots confirm that most woody tree seedlings do not survive more than two to three years. The cause of seedling deaths, suspected to be deer browsing, has not been conclusively determined.

#### *Fields*

Fifteen fields are maintained in the Jockey Hollow and New Jersey Brigade units, totaling 122 acres. These remain from agricultural activities prior to the establishment of the park. To retain this historic appearance, most are kept open by mowing. Mowing frequency varies from every other year, to yearly, to two to four times a year. Field vegetation includes grasses, herbaceous and woody plants, and numerous



*Figure 12: Natural Resources: Hydrology*



Figure 13: Natural Resources: Vegetation

species of birds, insects, and other animals that inhabit or frequent this community.

### *Orchard*

The Wick Farm orchard contains 121 trees that are a mixture of modern and heirloom varieties. Many trees are protected with wire fencing from browsing by deer, but herbivory from voles has been observed. Other routine maintenance is minimal, and the apples are not formally harvested.

### *Landscaped Grounds*

Informal plantings of trees, shrubs, and lawns are common in all park units, particularly along paths between visitor facilities. Such landscaped grounds are generally well maintained and in themselves do not represent an important resource. The Wick Farm contains lawn sections and many individual specimen trees around the house. Similarly, but on a larger scale, the Washington's Headquarters landscape contains lawns, shrub plantings, and numerous ornamental trees. Fort Nonsense contains many older canopy trees surrounding a sloping lawn and a few evergreen shrubs (*Rhododendron* spp.). Grasses (originally *Andropogon* spp.) outline the location of the 1777 Upper Redoubt. A limited amount of landscaping is maintained adjacent to the Jockey Hollow visitor center. More extensive lawns, specimen trees, and shrubs are maintained at the Cross Estate.

### *Gardens*

The park contains two formal gardens. The herb garden at the Wick Farm is a highly organized collection of annuals and perennials from the Colonial period, but not necessarily associated with the Wick Farm, enclosed by a substantial non-historic wire fence. The walled garden at the Cross Estate is also highly organized. It contains principally ornamental plants.

### *Wetlands and Riparian Resources*

Wetland and riparian areas in the park are for the most part small in size and associated with streams and minor tributaries. National Wetland Inventory

maps do not show these features. However, based on indicator plants such as skunk cabbage, wetland acreage is estimated at approximately 64 acres. The most extensive riparian areas in the Jockey Hollow unit flank Primrose Brook. Two small marshes are nearby. The first, Cat Swamp Pond, is currently dominated by forested wetland vegetation including black willows and other wetland trees and shrubs. The second marsh, similar in composition, is located below Cat Swamp Pond on the East Branch of Primrose Brook.

Wetland and riparian areas are found along the floodplain of Indian Grove Brook within the New Jersey Brigade unit. A small forested wetland lies at the intersection of Indian Grove Brook and a small feeder stream that runs southwest from Patriots Path. This wetland lies in an area of saturated soils.

A section of the Passaic River that runs through the New Jersey Brigade unit is the only portion of the park lying within a 100-year floodplain.

### *Other Vegetation*

The park's 1995 herbaceous plant inventory identified 291 species of herbaceous plants, along with 22 species of ferns. Five herbaceous plants found in the inventory are on the State of New Jersey list of threatened plants.

Diatoms are the predominant algae in park waterways, with maximum growth occurring during the spring. Species are characteristic of shallow rocky streams exhibiting high water quality, and appear to form an excellent food base for the herbivorous aquatic macroinvertebrates occurring in these waters. No rooted macrophytes were observed at any sampling site. The absence of these plants could be due to swift currents, rocky substrates, changing water levels, low nutrient availability, and limiting amounts of solar radiation during the growing season. However, an aquatic moss, *Fontinalis* spp., is common, and liverworts are sometimes found on exposed rocks in the stream channel or along the wet banks (Trama and Galloway 1988).

### *Fire*

There is no record of a major forest fire in the region for the past 70 years. Since 1950, there have been 31 fires in the park, 19 of them occurring in or on the boundary of the Jockey Hollow unit, 11 of them occurring in or on the boundary of the Fort Nonsense unit, and one occurring in the New Jersey Brigade unit. Of these fires, 21 have been under 0.25 acre, and 10 of them have been up to 10 acres in size. Only one of the fires was caused by lightning, while the remaining fires were either human-caused or unknown. At present, due to concerns for visitor safety and the proximity of adjacent homes, it is the policy of the park to suppress all fires.

The park's Eastern deciduous forests typically have a relatively low fuel load. But downed trees are prevalent in many areas of the park. Damage from wind and ice storms contribute to the fuel load. The oaks that dominate the park's forests are naturally fire resistant. Other tree species commonly found in the park, such as red maple, are very fire-sensitive and would have been eliminated if fires were common.

### **Wildlife**

The Middle-Atlantic region has harbored a wide range of animal life, both terrestrial and marine, which has changed over the past millennia as the environment evolved. During and immediately after the greatest advance of the glaciers, cold-weather species such as caribou, elk, moose, mastodon, saber-toothed tiger, dire wolf, short-faced bear, cave bear, and tapir inhabited the area, only to retreat north or become extinct by 10,000 years ago. In more recent times, deer, rabbit, otter, beaver, raccoon, squirrel, opossum, wolf, fox, mountain lion, and bobcat have inhabited the forests, some more common in the uplands than the coastal plains. Some species, such as wolf and mountain lion, were affected by human settlement, opening a niche for other species such as coyote.

Bird populations have been affected less by changing climates than by human impacts. Turkey, geese, grouse, pigeons, gulls, and a variety of song-

birds have inhabited the area for many millennia. As wetlands were developed into workable land, and fields returned to forest, certain species declined or were entirely eliminated from the region.

### *Deer and Small Mammals*

White-tailed deer (*Odocoileus virginianus*) are abundant in the park. Other large faunal species such as coyote, black bear, and red fox are rarely observed. Common smaller mammals include red and gray squirrel, rabbit, skunk, and raccoon. Voles are numerous in the Wick orchard and herb garden, and cause much damage to the apple trees.

A feasibility study of a fertility-control program for white-tailed deer is currently underway (Underwood 1997). Phase I provided a population estimate of the white-tailed deer population at the Jockey Hollow unit of 60.5 deer per square kilometer (151.2 deer per square mile) in 1997, and can be compared to a 1985 estimate of 65.4 per square kilometer or (163.5 per square mile). It appears that the maximum sustainable population for this environment has been reached, with the exponential phase of population growth having occurred a decade or so ago.

Deer are abundant in the surrounding areas, and in the region as a whole. Lewis Morris County Park, adjacent to the Jockey Hollow, conducted deer control programs in 1996 and 1997. Deer spotlight counts show an approximate 40–50% lowering in the number of deer observed in Jockey Hollow since the initiation of the Lewis Morris hunt. These numbers correspond to estimates by Underwood of deer density in the Jockey Hollow unit in 1998 to be 30 deer per square kilometer.

### *Birds*

Over 100 species of birds were documented during a recent bird census. Commonly found birds include the turkey vulture, red-tailed hawk, mourning dove, downy woodpecker, hairy woodpecker, Northern flicker, black-capped chickadee, white-breasted nuthatch, Northern mockingbird, yellow-rumped

warbler, scarlet tanager, chipping sparrow, song sparrow, common grackle, and American goldfinch.

### *Amphibians and Reptiles*

A reptile and amphibian inventory was conducted by the Wildlife Conservation Society in 2000 as part of the NPS Inventory and Monitoring Program. A total of seven salamander species were found including Northern red salamander, Northern dusky salamander, Northern two-lined salamander, Eastern red-backed salamander, Northern slimy salamander, and red-spotted newt. A total of six frog species were found including bull frog, green frog, pickerel frog, wood frog, Eastern American toad, and gray tree frog. A total of five species of turtles were found including Eastern box turtle, Eastern painted turtle, snapping turtle, common musk turtle and wood turtle. Four species of snakes were found including Eastern garter snake, Northern ringnecked snake, Northern water snake, and Eastern milk snake.

The survey determined that the park's herpetofauna has noticeably declined, not only in species composition, but also in population sizes, when compared with past observations. There was also a noticeable decline in spring peeper and gray tree frogs observed on park property compared to previous surveys and those seen on nearby properties. The draft survey report states that there are several plausible causes for the discrepancies: an increased deer population, an invasive earthworm species, increases in invasive nonnative plants, localized poor water quality, outbreaks of a virus, or a decrease in marsh habitat in the park.

### *Fish*

Fish found in the park's Jockey Hollow and New Jersey Brigade waterways include the blacknose dace, slimy sculpin, creek chub, brook trout, brown trout, and rainbow trout. Golden shiners are the only species found in Cat Swamp Pond. The brown and rainbow trout are considered invasive, nonnative species. The State of New Jersey lists the brook trout (*Salvenius fontinalis*) as a threatened species. The New Jersey Division of Fish, Game, and Wildlife has designated Indian Grove Brook and a segment of the

Passaic River from its source to Route 202 as "Wild Trout Streams." This designation recognizes the presence of a viable wild trout population and regulates stocking and fishing. The State does not stock within the park.

The types of benthic fauna found in park waters indicate a typical stony or hard-bottom habitat supporting a number of pollution-intolerant indicator species of mayflies, stoneflies, and caddis flies. A thorough evaluation of community structure indicates that all streams within the park support healthy, diverse, and abundant macroinvertebrate communities.

### *Pests*

Following NPS policy, the park allows native pests to function unimpeded, except as noted below. Many fungi, insects, rodents, disease organisms, and other organisms that may be perceived as pests are, in fact, native organisms existing under natural conditions and are natural elements of the ecosystem. Also, native pests that were evident in pesticide-free times are traditional elements in the park's cultural settings. The park may control native pests to:

- Conserve threatened, rare, or endangered species, or unique specimens or communities
- Preserve, maintain, or restore the historical integrity of cultural resources
- Conserve and protect plants, animals, and facilities in developed areas
- Prevent outbreaks of a pest from invading uninfested areas outside the park
- Manage a human health hazard when advised to do so by the U.S. Public Health Service

Deer ticks are common in the park, and there is considerable public concern about their role in the transmission of Lyme disease. Studies in the 1990s noticed that ticks preferred areas of higher moisture, such as in leaf litter. They tended to be found in lesser abundance along trails. A display in the Jockey Hollow visitor center presents this information to visitors and suggests staying on the trail. Brochures

on Lyme disease from the Center for Disease Control are regularly available at the visitor center.

In 1999 there was intense concern about mosquitoes transmitting West Nile viral encephalitis in the region. Two dead crows were found at the Washington's Headquarters unit in 2000. They were tested and one was found to be infected. The Morris County Mosquito Commission was invited to inspect the park. The commission declined, noting that the park possessed little wet habitat that would be appropriate to monitor. The park is part of an emergency response plan developed by local agencies to confront a major outbreak.

At various times in the past, gypsy moths have infested portions of the park woodlands. In partnership with the U.S. Forest Service, aerial and ground surveys for gypsy moths were conducted in the 1990s. Ground checks are no longer conducted, presumably due to the absence of moths. Aerial surveying continues. The park treats important specimen trees to control damage, such as hemlocks for woolly adelgid, *Adelges tsugae*, but otherwise views such occurrences as part of a natural cycle.

#### **VI. SPECIES OF SPECIAL CONCERN**

Several species that may be expected to utilize areas around or within the park are on the New Jersey State list or the federal list of threatened and endangered species. The species include the following:

- The bog turtle (*Clemmys mublenbergii*), federally listed (threatened), is known to occur within 1.5 miles of the park. These small, semi-aquatic turtles consume a varied diet of insects, snails, worms, seed, and carrion. They inhabit open, unpolluted emergent and scrub/shrub wetlands such as shallow spring-fed fens, sphagnum bogs, swamps, marshy meadows, and wet pastures. National Wetland Survey maps suggest that no bog turtle habitat is present within the park; however, more detailed survey may determine otherwise.
- The Indiana bat (*Myotis sodalis*), federally listed (endangered), is known to inhabit Morris County. The closest known hibernacula are

located within approximately 10 miles of the park. Indiana bats hibernate in caves and abandoned mine shafts from October through April. Between April and August, they inhabit floodplains, riparian and upland forests, roosting under loose tree bark during the day, and foraging for flying insects in and around the tree canopy at night. The park's large expanse of contiguous forested upland, traversed by forested wetland stream corridors, is highly suitable habitat for roosting and foraging bats. From late August to mid-November, Indiana bats congregate in the vicinity of their hibernacula, building up fat reserves for hibernation. Protection of Indiana bats during all phases of their life cycle is essential to preserving this species.

- Bald eagles (*Haliaeetus leucocephalus*), federally listed (endangered), are known to occasionally occur within the vicinity of the park.
- The wood turtle (*Clemmys insculpta*), state listed (threatened), has been observed on several occasions in the park around the Passaic River within the last few years.
- The cerulean warbler (*Dendroica cerulea*), federally listed as Category 2, has been occasionally observed in the park.
- The Cooper's hawk (*Accipiter cooperi*), state listed (threatened), nested in the park in 1995.

Several other bird species have the potential to occur in the park's fields. None are listed federally, but all are at some level of state concern. State endangered species are: upland sandpiper (*Batramia longicauda*), Northern harrier (*Circus cyaneus*), and sedge wren (*Cistothorus platensis*). State threatened species are: grasshopper sparrow (*Ammodramus savannarum*), savannah sparrow (*Passerculus sandwichensis*), and bobolink (*Dolichonyx oryzivorus*).

State of New Jersey threatened plants species sighted at the park include rattlesnake plantain (*Goodyera repens*), twinleaf (*Jeffersonia diphylla*), slender pinweed (*Lechea tenuifolia*), strict blue-eyed grass (*Sisyrinchium montanum*), and oak fern

(*Gymnocapium dryopteris*). A recent study conducted by Rutgers University did not verify the presence of these state listed species in the park.

#### **VII. AIR QUALITY**

Morristown NHP is located approximately 30 miles from New York City, in a densely populated region. High levels of ozone are frequent during the summer months. The ambient air quality standard for the park is designated as Class 2, and allows moderate increases in air pollution. For comparison, Class 1 represents the highest standard and permits no new sources. Although air quality elements are measured in Chester, nearly 5 miles from the Jockey Hollow unit, it is suspected that pollutants, particularly from non-park sources, may be affecting park resources. The levels of carbon monoxides, nitrogen oxides, hydrocarbons, and ozone are particular areas of concern.

The unit of the park suffering the most severe air quality is Washington's Headquarters, which has Interstate-287 forming its western boundary. Historic structures, vegetative and other natural resources, and employee health may be adversely affected by air pollution.

Vegetation has been cleared from the Fort Nonsense unit of the park for the purpose of creating historic vistas. Poor visibility at the overlook during certain weather conditions may be related to regional haze, automobile and truck emissions, and industrial sources.

Acid rain deposition is suspected to contribute to the changes in the composition and structure of the forested areas in the Jockey Hollow and the New Jersey Brigade units; however, this has not been scientifically established.

An air quality monitoring site for the State of New Jersey is located in the center of Morristown; however, there is a lack of similarity between the park and the Morristown sample location. Unfortunately, no other information on air quality relevant to the park exists.

#### **VIII. SOUND**

The urban and suburban setting presents substantial intrusive sounds to park visitors and staff. Yet the prevailing experience at all but the Washington's Headquarters unit is a peaceful one. The two chief sources of elevated sound levels are heavy vehicular traffic, and aircraft. On the grounds of the Washington's Headquarters unit, traffic noise from adjacent Interstate-287 dominates the visitor experience. Noise levels greatly diminish visitor enjoyment of the attractive historic setting, and prevents park staff from giving outdoor interpretive talks. Noise levels have been estimated at between 70 and 75 decibels, a range common in areas along highways. EPA studies indicate that exposure to such conditions over extended periods of time may cause damage to human hearing. These elevated noise levels may also impact wildlife at the unit.

At the Jockey Hollow and New Jersey Brigade units, the natural forest soundscape is predominantly quiet, representing an important resource often remarked on by park visitors. This is occasionally broken by sounds of other visitors, automobiles slowly touring the park, and distant traffic. Airplane overflights are becoming more common, with the majority of aircraft approaching Newark International Airport or Morristown Airport, a general aviation airport. Both Newark and Morristown airports are planning to increase their capacities. Baseline data from FAA monitoring studies at the Jockey Hollow visitor center (2001 and 2002) are expected to be available shortly.

No baseline data exist for the natural ambient sound levels in any park unit, but the presence of some man-made sounds is not inconsistent with the park's mission. Sounds from activities such as mowing fields, demonstrating the firing of muskets, soldiers drilling, or hut construction are all appropriate to the park's historic character and mission. And since its inauguration, the park has permitted automobiles on the loop road.

## VISITOR EXPERIENCE

### ***I. VISITOR ACTIVITIES AND SERVICES***

The park is open daily, year-round. Only the buildings close for Thanksgiving, Christmas, and New Year's Day. The grounds and most comfort stations are open from 9 a.m. to dusk. An entrance fee is collected at the reception desks inside the museum and at the Jockey Hollow visitor center.

#### **Characteristics of Visitation**

Visitors are divided, in general, between those who visit because of history and those looking for recreation. They participate in a wide range of activities and utilize the many park services at the different units. On average, the park receives approximately 530,000 visitors annually.

Those interested in history include serious scholars, college classes, fourth–sixth-grade student groups from northern New Jersey, historic house aficionados, and reenactment groups. At Washington's Headquarters they may take self-guided visits of the museum with exhibits on the Revolutionary War in Morristown, period weapons, and objects of 18th-century life. Visitors can view a short film in the 100-seat museum auditorium. The building also has restrooms and a small bookstore managed by Eastern National. Visitors may also perform research in the museum library, the location of several important collections and archives. The research facilities are open only limited hours and require an appointment. Approximately 50 research visits are made to the library annually. The Washington Association uses this facility for its monthly meetings. Beyond the museum, visitors may take a 45-minute ranger-led interpretive tour of the Ford Mansion, or walk the landscaped grounds.

Visitors to Jockey Hollow tend to begin at the visitor center, being oriented to the unit by a large mural that depicts the encampment landscape during the winter of 1780. Visitors may also take in a short film and an exhibit portraying a cross-section of a soldier's hut, and visit a small bookstore. These

exhibits are of critical importance because as the forest has returned, visitors have difficulty understanding the scale and scope of military activities that took place in Jockey Hollow. Guests leave the visitor center and walk or drive the gently rolling 3-mile loop road in Jockey Hollow, stopping at wayside markers, the Wick Farm, and five hut replicas at the Pennsylvania Line—the location of annual reenactments of the encampment. A network of unpaved trails intersects the road. The interpretive and educational program is focused at the Wick House and garden, which can be toured independently. Restrooms are available at the visitor center and near the park's Western Avenue gate. Overall, the visitor experience in the historic landscape is peaceful, offering moments of solitude and opportunity to reflect on historic events.

The New Jersey Brigade unit contains interpretive markers of the encampment. Rough outlines of several huts, with their hearth stones loosely refitted, lie sheltered below the forest canopy. This area gives visitors one of the best chances to imagine the soldier's experience. Visitors may access the area from a trailhead parking area in the Cross Estate, or by hiking the Patriots Path from Jockey Hollow.

Visitors to Fort Nonsense may observe a simple stone outline of the earthen fortification on the hilltop and gain an appreciation for Morristown's strategic setting from vistas overlooking the area. The vistas have grown narrower over time but remain compelling. On September 11, 2001 a large crowd formed on the hilltop, watching the fires in the towers of the World Trade Center. A series of wayside exhibits, a cannon, and a stone monument further communicate the history of the site. Narrow trails climb to the hilltop.

Increasing numbers of visitors come to the park for recreational purposes, utilizing park roads and trails, particularly in the Jockey Hollow and New Jersey Brigade units, for walking (often with young children and dogs), jogging, and bicycling. Modest numbers of visitors come to the park to ride horses



*Figure 14: Visitor Experience: Facilities*

and ski the trails and roads. Recreational visitors are primarily from the local area and arrive by car or bicycle. They may park at the visitor center or in the small satellite lots along the loop road. A small parking lot on Jockey Hollow Road serves as a trail center and provides central access to the park's 27 miles of trails. A small parking area adjacent to the New York Brigade site serves as an informal staging area for horseback riding. The trails offer visitors solitude, contact with nature, and scenic views. Several routes have been designed and marked. A pamphlet-sized map of these routes is available. Some visitors make use of the park's links to longer trails like the Patriots Path that extend beyond park boundaries. All park trails are closed to motorized vehicles and bicycles.

The park's natural environment attracts visitors looking for solitude, early evidence of springtime, and colorful forest displays in the autumn. Some areas are used for informal picnics, and Fort Nonsense is commonly used as a pleasant spot to eat lunch. The gardens at the Cross Estate are open to visitors, and are tended by members of the New

Jersey Garden Club. Except for special events, the remainder of the estate is not open to the public.

The steadily rising interest in active recreation threatens to conflict with other park uses. Concern for maintaining a peaceful atmosphere so valued by the more traditional users—and referenced in the park's authorizing legislation—has led management to deny special-use permits for competitive athletic events in the park, and prohibit mountain biking on trails. Skateboarding, roller-blading, and similar sports are growing activities, and pose similar issues to mountain biking, but are not prohibited.

Additionally, park visitors:

- tend to consist of small family groups living within 100 miles of the park and returning home at day's end;
- include both Boy and Girl Scout groups, who visit when camped in Lewis Morris County Park;
- include bus groups who stop for very brief visits;
- include new corporate employees being oriented to the area;

### Average Visits (1998–2000)

Month	Washington's Headquarters	Jockey Hollow	Fort Nonsense	New Jersey Brigade (incl. the Cross Estate)	Total
January	6,912	62,689	5,996	4,369	79,966
February	9,689	84,092	9,246	4,629	107,656
March	7,914	71,385	10,046	9,456	98,801
April	11,231	114,128	13,147	10,802	149,308
May	7,344	115,571	13,168	10,516	146,599
June	7,537	129,341	15,388	9,875	162,141
July	10,896	129,389	13,017	8,080	161,382
August	8,672	133,048	14,653	6,506	162,879
September	6,391	128,250	13,856	4,663	153,160
October	6,348	148,849	8,111	6,800	170,108
November	5,459	106,862	10,710	4,631	127,662
December	6,534	55,915	4,911	3,434	70,794
<b>Total</b>	<b>31,642</b>	<b>426,506</b>	<b>44,083</b>	<b>27,920</b>	<b>530,152</b>
<b>% of Total</b>	<b>6.0%</b>	<b>80.4%</b>	<b>8.3%</b>	<b>5.3%</b>	<b>100.0%</b>

- attend special events in the park, including encampments, “walk-a-thons,” weddings, and seasonal celebrations sponsored by partners; and
- include few minorities and inner-city residents.

### **Statistics**

Over the past five years, visitation at Morristown has averaged 526,867 annually. Visitation is fairly evenly distributed across the year. Jockey Hollow is the exception. There, visitation peaks during October (foliage season) and drops off substantially in midwinter. Jockey Hollow also receives the most visitors (426,506 yearly from 1998 through 2000) and accounts for approximately 80% of all park visits. Based on observations by park staff, the majority of these visitors come for recreational purposes not directly related to the park’s history.

Visitation is roughly equivalent among the other three units. It should be noted that lower visitor counts at Washington’s Headquarters reflect the park’s temporary reduction in school field trips as it introduces new curriculum-based programs.

Amounts are calculated from traffic counters in Jockey Hollow, Fort Nonsense, and the Cross Estate, and head counts at Washington’s Headquarters. These figures represent visits, not visitors, since visitors tend to appear at more than one unit.

### **Shuttle**

The park’s 1975 interpretive prospectus and 1976 master plan determined that interpretation and visitation in Jockey Hollow would revolve around a shuttle bus system. Much of the interpretive program was constructed, including the loop road, the comfort station at the Western Avenue gate, and many waysides were positioned for viewing from within vehicles. However, the shuttle buses were never purchased. Without the unifying interpretive device a shuttle bus system was intended to provide, visitors perceive the park’s aesthetic qualities more readily than its historical ones.

### **Special Events**

Several special events are notable. The park’s spring and fall Revolutionary War encampments generally draw 450–600 visitors over a weekend. The annual proclamation of the Declaration of Independence at the Washington’s Headquarters unit has consistently been well attended (250–400), despite rain. Other events include celebrations of George Washington’s Birthday, Saint Patrick’s Day, and a Holly Walk in December.

## **II. INTERPRETATION AND EDUCATION**

The educational and interpretive programs focus on four themes outlined in the park’s 1975 interpretive prospectus:

- Interpret military daily life, training, organization, supply, equipment, morale, housing, and discipline of Continental Armies during the winters of 1777 and 1779–80 at Fort Nonsense and at Jockey Hollow.
- Interpret the role of George Washington as Commander-in-Chief during 1777 and 1779–80 and the personal qualities that made him a great military leader, politician, and diplomat.
- Interpret life in Morristown as a typical village caught up in the American Revolution; its relationship to the Continental Army encamped on its doorstep; and domestic life in the 18th century.
- Interpret pre-1777 and post-1780 history, stories, and impacts of the Revolutionary War in Morristown, New Jersey, in 1779–80.

The park seeks to accomplish these through a well-developed program of printed materials, exhibits, films, tours, demonstrations, and living-history activities. Costumed and uniformed interpreters engage visitors from their posts at the museum, the Jockey Hollow visitor center, and the Wick House. Typical demonstrations include 18th-century woodcarving, spinning, weaving, herb gardening, and hut-building. Interpreters also give talks at venues outside the park. Educational staff operates the highly subscribed program for school

groups. However, many of the waysides are now dated or worn, and there is ongoing debate about the correctness and significance of several reconstructed interpretive devices like the Pennsylvania Line log huts. Several exhibits in park visitor areas, such as the films, are in need of rehabilitation.

### **Untold Stories**

As part of an NPS initiative, the park has begun developing programs to address untold stories, or themes not previously interpreted. Examples of these themes include ethnic diversity among the soldiers; how Morristown benefited from CCC and PWA labor in the 1930s; and the role of the Washington Association prior to the park's establishment in 1933.

### **“Parks as Classrooms” Program**

The park's activities in this NPS program are focused on helping to meet the curricular needs of fourth- and fifth-grade students in New Jersey. The first unit, titled *From Farming Village to Log House City*, introduces students to the histories of Morristown's encampments and to the effects that they had on the Continental Army's officers and soldiers, as well as the town's civilians. It aims to convey the great costs, personal hardships, and organizational obstacles associated with building and sustaining an army and winning American independence. Pre-visit activities place Morristown in the context of the American Revolution. Students use geography and locate the site for the winter encampment and lay out the camp. They study one of the historic figures of Morristown and experience the impact of the war on one individual. Students arrive at Jockey Hollow as one of the historic figures of Morristown, taking the role of a soldier, officer, or civilian. At the park they engage in a series of ranger-led activities, exploring various aspects of the site associated with historic figures. A series of post-visit activities complete the unit. The park provides a kit of materials including a teacher's guide, map, timeline poster, and cards from NPS Revolutionary War parks. A second unit is planned for Washington's Headquarters.

## **III. PARKING, CIRCULATION, AND ACCESS**

### **Regional Context**

The closest major airport is Newark International Airport, located approximately 20 miles southeast. Nearby general aviation airports include Morristown and Teterborough. Several highways, including I-287, and State Routes 202 and 24 serve the area. New Jersey Transit's Morris & Essex rail line connects Morristown with Newark and Penn Station in Manhattan.

### **Vehicular Circulation and Parking**

Once in the area, new visitors face a very confusing network of roads. There are difficulties in getting to the units, and in traveling between the units. High traffic speeds, congestion, and inadequate directional signage combine to create a profound sense of disorientation and frustration.

Access to the Washington's Headquarters unit is via three-lane, one-way Morris Avenue which takes visitors past the front of the Ford Mansion, through a residential neighborhood. The road leads visitors to a left turn that merges with three other lanes of high-speed traffic on Lafayette Avenue. Visitors must turn sharply left onto Washington Place, followed by a quick right into the parking lot. Several serious accidents have occurred at the intersection of Lafayette Avenue and Washington Place.

The main parking area (approximately 50 spaces, 6 handicapped, 6 bus) is spacious and well designed. However, the museum is located above the parking lot, is screened by trees, and is flooded by traffic noise from I-287. This tends to further diminish the sense of arrival. To exit the unit, visitors are again confronted with the same one-way loop whether they are headed to another park unit or to nearby highways.

The Fort Nonsense unit is reached from the Morristown Green by making a series of turns onto Washington Street, Western Avenue, and Ann Street. The paved two-lane park road leads from Ann Street to the hilltop where there are 12 parking places and a narrow turnaround.

The Jockey Hollow unit is most commonly reached from I-287. Visitors exit the highway and take local two-lane roads (Route 202 and Tempe Wick Road) for about 3 miles to arrive at the well-marked main entrance. Parking (112 spaces, including bus and handicapped spaces) is available at the visitor center. Entry to the paved loop road is from the parking lot. The road provides access to most of the features in the park, each with small satellite parking areas. The road also connects several staff residences. An extension to the loop, Sugar Loaf Road, connects the park to Lewis Morris County Park and the Western Avenue gate. A narrow, winding portion of Sugar Loaf Road receives fairly heavy traffic from the Delbarton School. This traffic includes school buses, service vehicles, and faculty and student vehicles. The segment of Jockey Hollow Road between the Western Avenue gate and Tempe Wick Road receives substantial non-park through traffic, particularly commuters avoiding congestion on other area roads.

The New Jersey Brigade unit can be reached from I-287 in much the same way as Jockey Hollow. Access is from a rural section of Jockey Hollow Road. Parking for visitors (up to 30 spaces) and park staff (8 spaces) is at the Cross Estate. Nearby are several park housing units, each with developed parking areas.

The difficulties associated with local travel appear to discourage new visitors from reaching more than one unit. Given the interrelated nature of the units, visitors who only stop at one unit may not gain a full understanding of Morristown's place in history, or appreciate the range of resources protected by the park.

### **Pedestrians**

At the Washington's Headquarters unit, asphalt and concrete paths connect the visitor parking lot, museum, and Ford Mansion. The paths from the visitor parking lot to the museum are steep and wind through a small patch of trees, perhaps intending to provide some space for visitors to decompress from

their drive to the park. They drop visitors at a small landing, adjacent to the staff parking lot, at what was originally the back door of the museum, now reconfigured as the main entry. The whole of the arrival sequence is not very satisfactory, particularly as noise levels are high (due to adjacent highway traffic) and there is a very poor sense of orientation (there are no glimpses of the Ford Mansion). The patch of trees, intended to reflect the forest of Jockey Hollow, is perhaps too small to convey that idea. Visitors more likely perceive the area as ill-maintained.

From the small landing, visitors may either enter the building or take an uphill path to the Ford Mansion around the west side of the museum, passing within yards of I-287. Other paths connect the museum to the Ford Mansion. These curve circuitously from the museum's original main entry to the front of the Ford Mansion. From these paths, the formal, symmetrical relationship between the museum and the mansion, a principal objective of the NPS circa 1935 plan for the site, is not part of the visitor's experience.

The town maintains a sidewalk along Morris Avenue, in front of the Ford Mansion. It connects to the historic semicircular brick path that approaches the mansion. The sidewalk also leads into Morristown center. However, the route is quite difficult. To reach the unit on foot, from the train station for example, requires visitors to cross numerous signalized intersections and at least one non-signalized highway on-ramp. Most paths are in need of repair.

Apart from the trails described earlier, there are limited facilities for pedestrians at the other, more rural units. Fort Nonsense has a short interpretive loop at the hilltop. Pedestrian circulation at the New Jersey Brigade unit is restricted to trails. The improved walkways in the Jockey Hollow unit are at the visitor center and Wick Farm complex. Wide paths connect the visitor center with the parking lot and the Mendham-Elizabethtown trace. Sidewalks bring visitors to the Wick House from the small

adjacent parking lot. In addition to the trails and minor walks, pedestrians make extensive use of the loop road.

### **Buses**

All paved park roads can accommodate bus traffic, and most units have provisions for bus parking. Washington's Headquarters and Jockey Hollow both have dedicated parking areas for about six buses each. Most buses can negotiate the turnaround at the top of Fort Nonsense; however, no parking is available. Buses can access the Cross Estate in the New Jersey Brigade unit and park adjacent to the road or in an open field.

## **IV. AMERICANS WITH DISABILITIES ACT COMPLIANCE**

Outdoor exhibits, the Jockey Hollow visitor center, the Wick House, and the museum at Washington's Headquarters are accessible and have conveniently located handicapped parking. The two-story Ford Mansion has limited accessibility. The remaining park facilities, including trails, are not generally accessible.

## **V. CARRYING CAPACITY**

In general, there are few issues related to carrying capacity as park facilities are adequate for current visitation. Most visitors judge the present visitor experience in the park to be satisfactory; however, there are several concerns, as follow:

- Historic roads in Jockey Hollow: Increases in automobile traffic may exceed the road's capacity to provide an enjoyable visitor experience for pedestrians and bicyclists, the predominant visitor group. Proposed wireless communication facilities and adjacent development could introduce numerous vehicles to the historic road network. Conflicts among modes of travel could become a safety issue as well as diminish the visitor experience. Similar conflicts could develop on certain park trails should their use for horseback-riding increase. A carrying capacity study of trails for horseback-riding should also address potential natural resource impacts. These could further

detract from the visitor experience. Furthermore, development of the Saint Mary's Abbey/Delbarton property, including a retirement facility and athletic fields, could vastly increase vehicular use of the historic road. Mixing resident, service, and emergency medical vehicles, with the current levels of bicyclists, park visitors in private automobiles, school buses (Delbarton School), and county residents looking to cut through to Route 24, could exceed the carrying capacity (and service capacity) of the road.

- Historic structures: Should visitation increase markedly, wait-time and crowding at the Ford Mansion and Wick House could diminish the quality of the visitor experience. Furthermore, while current use levels do not present problems, the safe occupant loads for the buildings have not been determined. Visitation is controlled at the Ford Mansion with scheduled tours limited in size to no more than 35 persons. On occasion visitors have to wait for up to an hour to visit the Ford Mansion. At the Wick House, visitors tend to self-regulate occupancy of this smaller space to between 5 and 15 persons. Waits are generally shorter. In addition to concern for the two buildings' structural integrity, park staff have expressed concern for protecting exhibits and furnishings. Similarly, the park has no indoor facilities to accommodate large groups, particularly school groups, participating in the park's education program. At present, such groups crowd into common space in the Jockey Hollow visitor center, or gather outdoors (in good weather) but encounter noisy conditions at the museum, or in the auditorium—which must then be closed to other visitors. Under these conditions certain interpretive activities are not possible and the visitor experience may become unsatisfactory.

## **PARK OPERATIONS**

### **I. ADMINISTRATION AND OPERATIONS**

The park identifies 38 positions in 7 divisions on its organizational chart as necessary to operate

the park. The number of full-time-equivalent (FTE) positions is 34. As of November 2001, the park employed 27 professionals in various fields. Ten positions are currently vacant. In fiscal year 2001, the park's operational budget was approximately \$2,005,000.

### **Divisions, Key Positions, and Facilities**

#### *Management*

*Superintendent:* Supervises seven division chiefs and key staff responsible for the day-to-day operation of the park. Provides overall direction for staff in the administration, maintenance, rehabilitation, protection, interpretation, and development of the park. Provides direction for short- and long-range planning efforts. Represents the park and Regional Director, maintaining liaison with private, state, and federal agencies, for the purpose of protecting and accomplishing the missions of the park and NPS.

*Management Support Advisor:* Provides direct assistance to the superintendent in park management and operation. Serves as the primary coordinator and manager of reports, coordinating park compliance with the Government Performance Results Act (GPRA), Performance Management and Data System (PMDS), Performance Management Information System (PMIS), Accountability Core Team (ACT), partnership services, youth services, internships and volunteer services, and Eastern National. Performs other duties related to analysis of data, and coordination and dissemination of information. Assists with the development of new programs that help to protect the park and accomplish its mission.

#### *Administrative*

*Administrative Officer:* Responsibilities include formulating the park's budget; and executing the budget, especially as it relates to tracking and balancing accounts against the total budget. In addition, the AO is responsible for the management and oversight of the collection of donated funds and fees. This officer also supervises an administrative staff, and advises division chiefs on filling personnel

vacancies. Responsibilities also include pay administration, payroll, timekeeping, purchasing of goods and services, property management, tracking and logging equipment, assistance with contract agreements, and coordinating computing and telecommunication services.

Administrative operations are located in the museum library wing, with ancillary offices and meeting spaces at the Cross Estate, utility area, and Jockey Hollow visitor center. At present, an experiment to share administrative services with Edison NHS, located some 20 miles away, is being attempted.

#### *Resource and Visitor Protection*

*Chief of Resource and Visitor Protection:* Manages and plans complex programs in resource and visitor protection, and visitor use management through law enforcement park rangers. Serves as an advisor to the superintendent on matters involving security, liaison with local law enforcement offices, boundary protection, and land acquisition. Responsible for all matters pertaining to security, traffic control, crowd control, special events, and special uses in the park. Ensures that law enforcement park rangers provide information and general interpretation to the general public. Serves as the coordinator for firearms, health and fitness, wildland fire, and annual fire training. Collateral duties include coordinating volunteers and trail program, managing the Student Conservation Association program, court liaison, and Central Violation Bureau liaison. Develops projects, budgets, recruits and hires to support the park.

Activities of the division and the percentage of staff time involved are as follow:

- Opening and closing park (16%)
- Patrolling (8%)
- Responding to incidents (7%)
- Reporting/administrative functions (10%)
- Training (6%)
- Collateral duties (20%)

- Other (30%). (This category includes annual and sick leave, and travel between park units.)

Typical issues facing the division include traffic-related incidents, illegal hunting, and vandalism. Traffic-related incidents include speeding violations, failure to comply with road signs, and vehicle equipment violations. Service incidents include all visitor assists (lost visitors, jump starts, keys locked in car), as well as escorts to the bank for fee deposits and assisting other local agencies with traffic accidents.

The park relies on local towns to provide additional law enforcement, and structural fire and EMS assistance when requested. The park does not have formal MOUs with any of the towns; however, concurrent jurisdiction allows local officers to maintain police authority within the park. The park does its best to assist other agencies when requested: providing assistance to Harding Township with traffic accidents outside the park on Tempe Wick Road, assisting Morris County Park police with incidents at Lewis Morris County Park, and assisting Morristown during July 4th events.

In general, staffing is inadequate; only one ranger is usually on duty at a time. Annual leave, sick leave, and training further reduce this level of staffing. Certain areas of the park, like Fort Nonsense, need to be patrolled at night on a regular basis due to problems with closure violations, drinking, etc. These types of “special patrols” are not generally possible. Most importantly, the November 2000 Visitor Management Resource Protection Assessment Program (VRAP) calculated that the park needs 10.80 Full Time Equivalent positions to run a proper program: twice the park’s current level.

The division operates with the following facilities and equipment:

- Ranger station in the New Jersey Brigade unit, utilizing the former carriage house of the Cross Estate

- Auxiliary office in the Jockey Hollow Visitor Center where some equipment and supplies are stored
- Four patrol vehicles with radios linking to the park dispatcher, the Morris County Sheriff’s Communication Center, and the Morris County Park Police
- Two horses kept at the Wick Farm

### *Facility and Maintenance*

*Chief of Facility Management:* Responsible for the maintenance, rehabilitation, and upkeep of all roads, trails, grounds, structures, employee housing, buildings, and utilities on park land. Supervises a staff of laborers, carpenters, mechanics, and janitors. Develops plans and budgets; participates in project scoping, project management, and proposal development.

Typical activities of the division include providing custodial work for all buildings; restoration work to all historic structures (including carpentry, painting, HVAC, plumbing, and electrical); and routine maintenance for all other structures (visitor center, ranger station, utility area, housing units, and the Cross Estate). The division maintains all cultural landscapes (mowing turf areas, field mowing, tree removal and pruning); provides snow removal services; and performs preventive maintenance on all park vehicles and equipment. Approximately 80% of staff time is spent on working on structures, while 20% of staff time is spent on the cultural landscape. Approximately 80% of work is planned, and 20% is emergency work, often caused by adverse weather. Backlog maintenance work is being contracted, with mixed results.

The primary maintenance facility (utility area) is located in the Jockey Hollow unit. It consists of four concrete buildings and service yards. The buildings are used for warehousing, offices, and storing building materials and equipment. One building inadequately supports carpentry, painting, automotive and equipment work. Maintenance equipment



*Figure 15: Administration and Operations: Facilities*

includes four trucks, a skid loader, a bucket loader, two Excel Hustlers, and a number of snow blowers and attachments for equipment.

### *Natural Resources*

*Biologist and Director of Natural Resource Operation:* Directs the planning and implementation of the park's natural resource management program and performs a wide variety of technical, management, and procedural duties in natural and cultural resources management, including vegetation management (and restoration), wildlife management, integrated pest management, cultural landscape management, hazardous waste, water quality, and wetland monitoring; prescribed fire management; and compliance procedures. In cooperation with researchers, designs, develops tests, and implements scientific inventory and monitoring protocols for the long-term monitoring of natural resources. Coordinates natural resources program by other agencies and organizations on adjacent lands. Develops and submits projects that help the park meet its mission. Responsible for compliance with the National Environmental Policy Act, the National Historic Preservation Act, and other regulations. Coordinates GIS, integrated pest management program, and manages the Youth Conservation Corps program. The division is critically understaffed.

### *Cultural Resources*

*Chief of Cultural Resources:* Responsible for carrying out policy and applying standards established to ensure preservation, systematic arrangement, accountability, proper storage, and accessibility of the large and complex collection of archival, cartographic, photographic, microfilm, rare books, and other historical documentary materials. Determines the objects that should be acquired to maintain a balanced collection. Arranges additions, loans, and makes proper disposal of items no longer needed. Cooperates with state and local organizations for special exhibits. Prepares guidelines, standards, and operating procedures governing the physical care, use, storage, and preservation of collections. Provides advice to the interpretative division for the replacement of original artifacts with

reproductions for program use. Provides scholarly and historical reference and research services, including the preparation of written replies and finding aids, relating to the holdings and significance of the collections. Provides assistance to the superintendent in matters pertaining to museum expansion, preservation and rehabilitation of historic structures, the development of the park's general management plan, and the development of an administrative history of the park. A museum curator and other support staff are needed.

### *Interpretation, Education, and Fee Operation*

*Chief of Interpretation, Education, and Fee Operation:* Responsible for program management, budget, and supervision of the year-round interpretative program through nine park rangers and park guides. Administers park-wide programs for interpretation, special interpretative events, and interpretative tours. Ensures that the park conducts routine dynamic living-history programs for both adults and children, and that staff members are conducting such programs consistent with the mission of the park. Prepares comprehensive planning documents, proposals, and reports as required by the NPS. Manages school-based and curriculum-based programs. Develops and expands such programs in a manner that fulfills the park's mission and satisfies New Jersey Core Content Standards in the area of history. Oversees the community outreach program in tourism councils, at planning board meetings, and in interpretive and historical programs and conferences. Ensures that fees are collected in accordance with the NPS Fee-demonstration program. Ensures that quality interaction with the visitors is occurring in fee collection, and that receipts of fees are balanced daily.

## **II. PARTNERSHIPS AND OUTREACH**

### **The Washington Association of New Jersey**

Stewards of the Ford Mansion from 1873 to 1933, the Washington Association of New Jersey was designated as the park's advisor in the 1933 legislation that established the park. Meeting at the park monthly, the WANJ has been of enormous assistance to the park. Recent WANJ activities include spon-

soring archeological research, hosting special commemorative events, and donating historic resources and collections. At present, the association is raising funds to complete the museum rehabilitation and enhance interpretation at Fort Nonsense.

### *Cooperative Agreements*

The park has cooperative agreements for research and technical support with William Patterson and Rutgers Universities.

### *Special-Use Permits*

The park's issuance of special-use permits is done in accordance with RM-53, Special Park Use Guidelines. In general, the park receives more requests for permits than it issues. Requests for weddings are most common. The park's policy on weddings is quite restrictive; there has only been one permit issued for a wedding since 1999. Other common requests are for bicycle races and walk-a-thons in Jockey Hollow, and business meetings and luncheons at the Cross Estate. Most requests for bike events or charitable walk-a-thons are denied, usually on the basis that the event would restrict public use and does not have a connection to the purpose for which the park was established.

Most permits for luncheons and business meetings have been issued to organizations that have a pre-established relationship with the park, such as the New Jersey Historical Garden Foundation, Great Swamp Watershed Association, Sojourners, and Boy Scouts.

Special-use permit requests involving rights-of-way for wireless communication towers are becoming more frequent, particularly in Jockey Hollow. These have the potential to cause serious environmental impact and damage to the visitor experience. A recent permit issued to conduct a test on the hill above Quarters #35 resulted in damage to two park areas. Another party has expressed interest in a site near the Stark's Brigade encampment area, one of the park's most scenic trails. At present, seven carriers are licensed in the Jockey Hollow area.

Other permits that are of great importance are those that affect normal park operations or have the potential for law enforcement concerns. For example, the Second Amendment Sisters rally in Jockey Hollow in May 2001 had the potential for counter-demonstrators. This caused the park to bring in additional law enforcement rangers from other parks and block off areas of the visitor center parking lot to normal traffic.

## **SOCIOECONOMIC ENVIRONMENT**

### **I. INTRODUCTION**

Morristown NHP is located in Morris and Somerset Counties. Both counties are located approximately 30–40 miles west of New York City, and are part of the largest metropolitan area in the nation. Morris County encompasses 469 square miles, while Somerset County encompasses 305 square miles.

### **II. DEMOGRAPHIC PROFILE**

Population in Morris and Somerset Counties grew at a rate faster than the state of New Jersey, which grew 8.6% overall in the 1990s.

Morris County grew by 48,859 people in the 1990s to 470,212 counted in the 2000 Census, an 11.6% increase. Morris County's population is predominantly white (88.4%), with small, but increasing Asian and Hispanic populations. Population density is high, with 1,002.6 people per square mile in Morris County compared to the average of 964.7 people per square mile across the state.

The median household income in Morris County was \$56,273 in 1990 (the most recent data available) compared to the statewide median household income of \$40,927 in 1990. The median family income in Morris County was \$62,749 in 1990 compared to the statewide median family income of \$47,589 in 1990. The median non-family household income in Morris County was \$31,859 in 1990 compared to the statewide median non-family household income of \$22,287 in 1990.

Morris County is comprised of 39 municipalities and is a mixture of city and suburban environments with an increasingly diverse population, industry, and major office buildings.

The Town of Morristown is Morris County's largest population center with 18,544 residents.

The 1990s saw Somerset County grow by 57,211 people to 297,490 in 2000, an increase of 23.8%—nearly double the rate of Morris County. Somerset County's population is predominantly white (79.3%), with growing Black, Asian, and Hispanic populations. Population density is high, with 975.4 people per square mile in Somerset County compared to the state average of 964.7.

The median household income in Somerset County was \$55,519 in 1990 (the most recent data available) compared to the statewide median household income of \$40,927 in 1990. The median family income in Somerset County was \$62,255 in 1990 compared to the statewide median family income of \$47,589 in 1990. The median non-family household income in Somerset County was \$33,472 in 1990 compared to the statewide median non-family household income of \$22,287 in 1990.

Somerset County is comprised of 21 municipalities and contains urban and suburban neighborhoods and limited rural land.

### **III. ECONOMY**

The economy of Morris County includes pharmaceuticals, electrical machinery and equipment, chemicals, scientific and controlling instruments, stone, rubber, and plastic products, printing, publishing, and fabricated metal products.

The economy of Somerset County includes services, manufacturing, retail, trade, finance, insurance, real estate, communications, utilities,

wholesale trade, transportation, construction, agriculture, and mining.

Large numbers of residents in both counties commute to employment centers outside of the area, including New York City and Newark.

Tourism is a significant sector of the Morris County (39 municipalities) economy. In 1999, travel and tourism were responsible for \$1.4 billion in expenditures in the county: \$493 million at restaurants; \$396 million at retail stores; \$220 million for car rentals; \$178 million for lodging; \$102 million for recreation; \$15 million for local transportation. The tourism sector in Morris County in 1999 accounted for 39,000 jobs, \$907 million in payroll, \$172 million in state taxes, and \$91 million in local taxes. Morris County has 33 hotels, motels, and bed-and-breakfasts, with a total of 5,134 rooms.

According to the "Historic Morris Visitors Center, Inc. Heritage Tourism Assessment" (2000), an estimated one million overnight visitors experienced historic Morristown, 2% of New Jersey's total tourism market. Morristown NHP is the leading heritage attraction in Morris County. The Historic Morris Visitors Center, Inc., which serves all of Morris County, uses the park as a centerpiece in marketing heritage tourism in Morris County.

### **Economic Impact of Visitation**

Between 1998 and 2001, an annual average of 530,000 visitors came to Morristown NHP. The park's museum and Ford Mansion attracted 32,000 visitors. Approximately 498,000 visitors entered other units of the park for recreational purposes. Through employing the NPS's Money Generation Model 2, it is apparent that there are specific economic impacts generated by Morristown NHP. Between 1998 and 2001, visitors to the museum spent an estimated annual average of \$893,600 in the surrounding community for meals, rooms, shopping, and services. The breakout of

expenditures by categories of visitor follows in the table below.

The 498,000 visitors who did not visit the museum were mostly local residents coming for a ride or walk through the park. Most of these visitors would have no net economic impact on the community. Nevertheless, a certain proportion of the 498,000 visitors would be in the area as tourists, and would make some expenditures. Since Morristown NHP has not surveyed visitors for their average expenditures, it is difficult to estimate their economic impact, although there is a beneficial impact of some amount.

The expenditures of visitors to the museum generated 16 jobs in the local tourism industry and led to an additional 9 jobs supplying products and services to tourism businesses. The total economic impact of direct and indirect spending was \$1,233,200, and personal income was \$330,600. This does not include the impact from expenditures of those visiting other units of the park.

**IV. DEVELOPMENT TRENDS**

The development trends in Morris and Somerset Counties roughly reflect the population fluctuations and economic conditions nationwide. In 1990 Morris County reported a total of 798 building permits, while Somerset County reported a total of 1,273 building permits. In 2000, Morris County reported 2,684 building permits, while Somerset County reported 2,282 building permits.

In 1990 Morris County had a housing vacancy rate of 6.6%, while Somerset County had a housing vacancy rate of 7.9%. In 2000 Morris County had a housing vacancy rate of 3.5%, while Somerset County had a housing vacancy rate of 3.8%. In 1990 Morris County had 155,745 total housing units, while Somerset County had 92,653 total housing units. In 2000 Morris County had 174,379 total housing units, a 10.7% increase, while Somerset County had 112,023 total housing units, a 17.3% increase.

**V. ADJACENT LANDS**

The Washington’s Headquarters and Fort Nonsense units are located within the town of Morristown. Adjacent lands, already densely developed, are in several cases being redeveloped to still greater densities. These projects include the redevelopment of the nearby Washington School site for condominiums, a mixed-use “Transit Village” on lands owned by New Jersey Transit adjacent to the station, and construction of additional housing units on hillside lots that back up to Fort Nonsense.

The Jockey Hollow and New Jersey Brigade units, however, are located in a more rural area, which for the last several decades has been experiencing a rapid population increase facilitated by the completion of new highways and improved access to New York City. Changing land use patterns, associated with sprawl, are dramatically changing the character of the area. The rolling hills, intersected by streams, valleys, and wetlands, were until recently either

**Average Annual Visitor Expenditures (1998–2001)**

Visitor Type	# Visitors	# Parties	Expend/Party/Day	Expenditures
Overnight (20%)	6,400	3,200	\$179	\$572,800
Daytrippers (55%)	17,600	8,800	\$31	272,800
Students (25%)	8,000	8,000	\$6	48,000
<b>Total</b>	<b>32,000</b>			<b>\$893,600</b>

farmed or covered with mixed hardwood forests. At present, the prevailing character is of an affluent suburb with single-family residential development on large lots (2 to 5 acres). Numerous office parks, other commercial establishments, and expanded recreational facilities, such as golf courses, are connected via a heavily traveled road network. Accompanying these land uses are eight FAA-approved wireless carriers. There is increasing pressure on the park to provide sites for communication towers.

As in Morristown, several large-scale development projects loom on the park's Jockey Hollow boundary. These projects include development of a 500-bed retirement community adjacent to Sugar Loaf Road, a sports center across the street from the Guerin farmhouse, and an expanded and upgraded, all-weather Girl Scouts camp on a hilltop overlooking Tempe Wick Road.

Real estate costs continue to increase throughout the area. Small lots with small homes off Route 202 often sell for prices above \$500,000. And the few large parcels remaining, such as the Saint Mary's Abbey/Delbarton School property, are guarded for their potential to support large, profitable development.

As the region has grown, noise from aircraft frequently intrudes on the visitor experience. Newark International and Morristown airports are the two busiest airports in New Jersey. Both continue to expand.

## **VI. LAND CONSERVATION**

Counter to this trend, advocacy for land conservation runs strong. Several long-standing organizations, such as the Great Swamp Watershed Association, are joined by newer groups like the Jockey Hollow Neighborhood Association in an effort to protect open space, environmental quality, and the remaining rural character. Morris County has invested heavily in trails, and recently completed an

award-winning plan for the restoration of the nearby Rockaway River—with similar studies underway for the Whippany River. The Morris County Parks Commission manages numerous fine parks, including the historical farm at Fosterfields, and recently acquired Historic Speedwell, a collection of historic houses and structures about 1 mile north of Morristown.

The State of New Jersey is also very active in land conservation. Through the Green Acres Program the state proposes to spend \$27 million in 2001 to purchase land for historical, recreational, agricultural, and ecological values. This and other state programs reflect an increasing awareness among New Jersey citizens of the importance of conservation—and the urgency of taking action now. Likewise, Morris County citizens have overwhelmingly voted to increase their own taxes for open space preservation. This is a tangible mandate.





## CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

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*The encampment spread out across three large farms in Jockey Hollow. Henry Wick rented half of his house to General St. Clair and several officers on his staff. The house and many portions of his farm remain.*



## CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

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### METHODOLOGY

This chapter describes the potential environmental consequences, or impacts, associated with implementation of the alternatives. It identifies the categories of resource impacts evaluated, as well as resource impacts deemed not relevant to this plan. Impacts for each of the alternatives are presented by category. The chapter concludes with a comparative summary of impacts for all three alternatives.

The potential for implementation of the alternatives to generate environmental impacts was examined by an interdisciplinary team drawn from Morristown NHP, NPS Boston Support Office, NPS Northeast Region, and consultants. In a series of meetings, the team determined the type, intensity, and duration of impacts. In making the evaluations the team drew upon current scholarship, information provided by experts in the NPS and other agencies, and their professional experience in resource management. It is important to remember that all the alternatives include mitigating measures to minimize or avoid impacts. If mitigating measures described below and in the alternatives were not applied, the potential for resource impacts and the intensity of those impacts would increase.

The draft GMP/EIS is a programmatic statement. The alternatives each consist of a basic management framework for future decision making. Specific potential actions for each alternative are included to the extent that they have been developed. Decisions about specific actions will be deferred to implementation planning. Before any major individual actions described in the alternatives are undertaken, more detailed, site-specific analyses and compliance documentation required by National Environmental Policy Act (NEPA) and Section 106 of National Historic Preservation Act (NHPA) would be developed.



*The Ford Mansion was built between 1772 and 1774 by a wealthy iron manufacturer, Jacob Ford. Photo by Mike Warren.*

#### **I. TYPE OF IMPACT**

**Adverse:** Impacts would tend to diminish the quality, health, or integrity of resources and values.

**Beneficial:** Impacts would tend to strengthen or improve the quality, health, or integrity of resources and values.

#### **II. INTENSITY OF IMPACT**

Thresholds for evaluating the intensity of impacts are described differently for the different resource types as follows:

##### **Natural**

- **Negligible:** The impact would be localized and not detectable, or would be at the lowest levels of detection.
- **Minor:** The impact would be localized and slightly detectable but would not affect the overall structure of any natural community.
- **Moderate:** The impact would be clearly detectable and could have an appreciable effect on individual species, communities, and/or natural processes.
- **Major:** The impact would be highly noticeable and would have a substantial influence on natural re-

sources, including impacts on individuals or groups of species, communities, and/or natural processes.

### **Cultural**

- Negligible: The impact would be barely perceptible and not measurable; it would be confined to small areas or would slightly affect a single contributing element of a historic landscape or structure.
- Minor: The impact would be perceptible and measurable, would remain localized and confined to a single contributing element of a historic landscape or structure, or would not affect the character-defining features of a historic landscape or structure.
- Moderate: The impact would be sufficient to cause a change in a character-defining feature but would not diminish the integrity of the resource to the extent that its eligibility for listing on the National Register of Historic Places would be jeopardized, or it generally would involve a single or small group of contributing elements.
- Major: The impact would result in substantial and highly noticeable change in character-defining features, which would diminish the integrity of the resource to the extent that it would no longer be eligible for listing on the National Register, or it would involve a large group of contributing elements and/or significant resources.

### **Visitor Experience**

- Negligible: The impact would be barely detectable, would not occur in highly visited areas, or would affect few visitors.
- Minor: The impact would be slight but detectable, would not occur in highly visited areas, or would affect few visitors.

- Moderate: The impact would be readily apparent, would occur in highly visited areas, or would affect many visitors.
- Major: The effect would be severely adverse or exceptionally beneficial, would occur in highly visited areas, or would affect the majority of visitors.

### **Socioeconomic**

- Negligible: Impacts with less than a 1% change
- Minor: Changes of 1–10%
- Moderate: Changes of 11–15%
- Major: Changes over 15%

### **III. DURATION OF IMPACT**

Impacts are characterized as short-term or long-term as follows:

Short-term: The impact would last less than one year, normally only during construction.

Long-term: The impact would last more than one year.

## **IMPACTS CONSIDERED IN ANALYZING THE ALTERNATIVES**

In accordance with federal law and regulations and NPS policies, this draft GMP/EIS evaluates the environmental consequences resulting from the alternatives against the topic areas listed below. Topics that were determined not to be relevant to the park are listed in the section “Impact Topics Eliminated from Further Evaluation.”

### **I. CULTURAL RESOURCES**

The National Historic Preservation Act, as amended in 1992 (16 USC 470 *et seq.*); the National Environmental Policy Act; and the NPS Cultural

Resource Management Guidelines (1994) and Management Policies (2001) require the consideration of impacts on cultural resources listed on or eligible for listing on the National Register of Historic Places. The undertakings described in this document are subject to Section 106 of the National Historic Preservation Act, under the terms of the 1995 Programmatic Agreement among the NPS, the Advisory Council on Historic Preservation (ACHP), and the National Conference of State Historic Preservation Officers. Numerous park resources are listed on the National Register, and by virtue of their location within a national park, all other cultural resources are considered eligible for listing. The four resource categories are historic landscapes, structures, archeology, and collections. Treatment of these resources is a focus of the draft GMP/EIS.

## **II. NATURAL RESOURCES**

### **Soils**

National Park Service policies require the consideration of impacts to soils. The park's soils, overlaying rolling hills, ridges, and valleys, are moderately prone to accelerated erosion. The alternatives propose policies and actions that have the potential to impact soils, principally through modification of vegetation.

### **Water Resources**

NPS policies require protection of water resources consistent with the Federal Water Pollution Control Act, commonly known as the Clean Water Act. The waters within the park are also protected by the State of New Jersey Water Quality Standards. Primrose Brook and its tributary are designated as FW-2 Trout Production Waters. Primrose Brook is also recognized as Category One water (antidegradation) that is further protected from measurable changes to existing water quality. The State of New Jersey designates the Upper Passaic River and Indian Grove Brook as Wild Trout Streams. Actions proposed under the alternatives have the potential to impact water resources.

### **Biological Resources**

The National Environmental Policy Act (1969) requires analysis of impacts on all affected components of the ecosystem, including biotic communities of plants and animals, and wetlands and riparian areas. NPS Management Policies (2001) requires maintenance of these communities, including their natural abundance, diversity, and ecological integrity. Large areas of undeveloped land in the Jockey Hollow and New Jersey Brigade units supports a range of important biological resources. Actions proposed under the alternatives have the potential to impact biological resources.

### **Floodplains and Wetlands**

NPS Director's Order 77-1 and further guidelines and policies require consideration of impacts on floodplains and wetlands (Executive Orders 11988 and 11990). An area along the Passaic River lies in the 100-year floodplain, and several wetlands and riparian areas are present within the park. The alternatives contain proposed actions that have the potential to impact floodplains and wetlands.

### **Species of Special Concern**

The Endangered Species Act (1973) requires disclosure of impacts on all federally threatened or endangered species. NPS policy also requires analysis of effects on federal- as well as state-listed threatened, endangered, candidate, rare, declining, and sensitive species. Several plant and animal species of concern have been documented in the park and region. Consultation with the U.S. Fish and Wildlife Service identified the potential for actions proposed in the alternatives to impact species of special concern. Official communication with the U.S. Fish and Wildlife Service is included in Appendix III.

### **Air Quality**

The Federal Clean Air Act, as amended in 1977, stipulates that federal land managers have an affirmative responsibility to protect a park's air-quality-related values (including visibility, plants, animals,

soils, water quality, cultural resources, and visitor health) from adverse impacts due to air pollution. The ambient air quality standard as established by the State of New Jersey for the area covering the park is Level II. Actions proposed under the alternatives have the potential to impact air quality.

### **Sound**

NPS Management Policies (2001) and DO-47, Soundscape Preservation and Noise Management, state that parks will preserve, to the greatest extent possible, the natural soundscape. The natural soundscape is the aggregate of all the natural sounds that occur in parks, together with the physical capacity for transmitting natural sounds. The relatively natural soundscape at most units of Morristown NHP has been identified as critical to the visitor experience. Actions proposed under the alternatives have the potential to impact the natural soundscape.

### **III. VISITOR EXPERIENCE**

#### **Visitor Activities and Services**

The mission of the NPS, as defined by its Organic Act of 1916, states that the purpose of all parks is to “*conserve the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same.*” NPS Management Policies (2001) direct the park to promote and regulate appropriate use of the park and provide the services necessary to meet the basic needs of park visitors and to achieve each park’s mission goals. The alternatives have the potential to change the wide range of visitor activities and services available in all park units.

#### **Interpretation and Education**

Guided by NPS policy, each park’s interpretive and educational program must be grounded in (1) park resources, (2) themes related to the park’s legislative history and significance, and (3) park and NPS mission goals. The intent is to provide each visitor with an interpretive experience that is enjoyable and inspirational, within the context of the park’s resources and the values they represent. In

addition, visitors should be made aware of the purposes and scope of the national park system. Within this framework, the alternatives considered in the GMP propose substantial differences in the objectives of the park’s interpretive and educational program.

### **Carrying Capacity**

National Park Service policies, including DO-2, require the consideration of impacts to the carrying capacity of park facilities—the type and level of visitor use that can be accommodated while sustaining the desired resource and visitor experience conditions. This topic is included because policies and actions outlined in the alternatives have the potential to affect carrying capacity.

### **IV. PARK OPERATIONS**

#### **Administration and Operation**

The NPS Strategic Plan for 2001–2005 directs the park to use effective management practices, systems, and technologies to accomplish its mission. The GMP alternatives propose important differences in resource management that have implications for park administration and operation.

#### **Partnerships and Outreach**

The NPS Strategic Plan for 2001–2005 directs the park to strengthen and expand its network of partners and work cooperatively to preserve and interpret resources related to Morristown NHP and the larger context of the park in relation to the Revolutionary War. The alternatives in this GMP outline different approaches to fulfilling Service-wide goals for partnership and outreach.

### **V. SOCIOECONOMIC ENVIRONMENT**

NEPA considers “impacts to the human environment” to include any effects of federal actions on the social and economic well-being of communities and individuals. Research on socioeconomic impacts was done by obtaining socioeconomic data from Morristown NHP and state and local agencies.

Economic impacts were determined by using the formulas provided in *Estimating National Park Visitor Spending and Economic Impacts: Money Generation Model Version 2* (Stynes, Propst, Chang, and Sun 2000.) The estimated visitor expenditures were drawn from “Table C3: Generic Spending Profile—Historic Sites—High,” page C.4. The employment and spending multipliers were taken from “Table E4. Multipliers for states (state level regions or regions including larger metro areas with populations of 1 million and more),” page E-2.

#### **VI. CUMULATIVE IMPACTS**

The Council on Environmental Quality (CEQ) regulations implementing NEPA require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined by CEQ as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably, foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

#### **VII. IMPAIRMENT OF RESOURCES**

NPS Management Policies (Section 1.4, NPS 2001) and Director’s Orders 12 and 55 require that potential impacts be analyzed to determine whether or not proposed actions would impair the resources of the unit. The fundamental purpose of the national park system, established by the 1916 Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve resources and values. National park managers must always seek ways to avoid or minimize, to the greatest degree practicable, adverse impacts on the resources and values. However, the laws do give the NPS the management discretion to allow impacts on the resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the

affected resources and values. Although Congress has given the NPS this management discretion, that discretion is limited by the statutory requirement that the Service must leave the resources and values unimpaired unless a particular law directly and specifically provides otherwise.

The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of the resources and values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact on any resource or value may constitute impairment. An impact would be most likely to constitute an impairment if it affected a resource or value whose conservation would be (a) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park, (b) key to the natural or cultural integrity of the park or to opportunities to enjoy it, or (c) identified as a goal in the park’s GMP or other relevant NPS planning documents. Impairment might result from NPS activities in managing a park, visitor activities, or activities undertaken by concessionaires, contractors, and others operating in the park.

#### **VIII. SUSTAINABILITY AND LONG-TERM MANAGEMENT**

NPS policy (DO-12) requires consideration of (1) short-term uses and long-term productivity, (2) irreversible and irretrievable commitment of resources, and (3) unavoidable adverse effects on park resources. The alternatives considered in the GMP, particularly for collections storage and forest management, have implications for sustainability and long-term management.

#### **IMPACT TOPICS ELIMINATED FROM FURTHER EVALUATION**

The following topics are not considered in the evaluation of the environmental consequences of the alternatives.

### ***I. GEOLOGY AND TOPOGRAPHY***

NPS policies require the consideration of impacts on geology and topography. The alternatives do not propose policies or actions that would affect this topic. However, potential impacts associated with accelerated erosion on the park's rolling hills, ridges, and valleys are considered under the heading Soils.

### ***II. PRIME AND UNIQUE FARMLANDS***

CEQ requires an assessment of impacts to all prime and unique farmlands within the project area (August 1980). Such resources do not exist within the park. Therefore, this was not considered a relevant impact topic.

### ***III. ENVIRONMENTAL JUSTICE***

Executive Order 12898, "General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their actions on minorities and low-income populations and communities. The communities surrounding the park contain a mix of incomes and ethnic backgrounds and are not considered predominantly minority or low income. The actions contained in the GMP would not have significant adverse impacts on minorities and low-income populations and communities; therefore this topic is not addressed further.

### ***IV. NATIVE AMERICAN GRAVES PROTECTION AND REPATRIATION ACT (NAGPRA), SACRED SITES, AND INDIAN TRUST RESOURCES***

NPS and other federal regulations and policies concerning Native American resources and federal trust responsibilities require assessment of impacts to these resources within a framework of government-to-government consultation with affected tribes. No Native American archeological sites within park boundaries have been recorded with the Historic Preservation Office of the New Jersey Department of State. There are no sacred sites or trust resources

within the park, and surveys would be completed prior to any construction activities or ground-disturbing maintenance; therefore this impact topic is not analyzed.

## **CONSEQUENCES OF ALTERNATIVE A**

### **Summary of Alternative A**

This alternative represents a continuation of current practices with current plans remaining in force. All projects under approved plans could be carried out; however, it might be difficult to respond to conditions that have changed since the adoption of the Bicentennial-era master plan. This alternative should be considered the "no action" baseline for comparison with the "action" alternatives. Key actions include:

- Modest improvements are made to the museum for collections storage and exhibits.
- Forest management continues to be limited.
- Interpretation remains centered on the encampments.
- An interpretive shuttle is developed in Jockey Hollow.
- Land acquisition is limited to 8.56 acres on a willing-seller basis to protect park resources.
- Participation in regional initiatives is minor.

Management prescriptions and possible actions under this alternative are described in detail in Chapter 2.

### ***I. CULTURAL RESOURCES***

#### **Historic Landscapes**

The existing Revolutionary War period landscape resources, such as the setting of the Ford Mansion and the Wick Farm, have deteriorated to the point where they are only in fair condition. However, these resources are stable, and would remain so given present maintenance practices. Although the current plan does not address cultural landscapes as a distinct

resource, other planning documents, such as cultural landscape inventories and reports, inform management. Continuing existing management policies under Alternative A would likely have negligible impacts on encampment period historic landscapes.

Commemorative era resources, such as the museum and restoration work on the Wick House, are not formally recognized as historically significant. Minor features, such as walks and fences, do not receive the same level of maintenance as other resources. Several have been lost; many continue to deteriorate, and may be lost in a matter of years if no action is taken to protect and stabilize them. Continuing existing management policies under Alternative A would likely have a major, long-term, adverse impact on commemorative landscapes.

The high value of the forest as a cultural resource—its ability to inspire and cause visitors to reflect on the virtues of the American Revolution as referenced by NPS Director Horace Albright in the 1930s—continues to degrade. This is evidenced in part by the spread of nonnative plant species, such as Japanese barberry and Siebold's viburnum. Documented by Rutgers University ecologist Emily Russell (1995, 2001), this process is particularly acute in large portions of the Jockey Hollow forest where the native understory is being replaced by invasive species. The eventual result of this condition, if left unchecked, would likely be a substantial loss of the character that Congress was trying to protect when it created the park. Without intervention, it is likely that the native hardwoods would not regenerate, and the area could eventually become a shrubby thicket with little scenic value or ability to provide the desired visitor experience. Alternative A does not provide direction for management in terms of how to arrest or reverse this deterioration of what is considered to be a critical cultural and natural resource for the park. Continuing existing management policies under Alternative A would likely have a major, long-term, adverse impact on the historic forest.

Alternative A would maintain the acreage ceiling (see Appendix II) at 8.56 acres and focus on acquiring

limited abutting properties. However, significant resources have been identified on more than 8.56 acres of adjacent lands. Further, there are development proposals for several large parcels that would likely diminish the integrity of historic park landscapes. In several cases, the mitigation proposed by private developers would reduce but not avoid major impacts. The present acreage ceiling restricts and delays the park's ability to respond to incompatible development proposals. Impacts associated with retaining the 8.56-acre ceiling would likely be major, long-term, and adverse.

### **Structures**

The museum would continue to suffer from gradual deterioration from water infiltration. The structure could be rendered unusable for collections storage if these conditions are not reversed. In addition, this structure and others in the park do not have fire suppression systems, contrary to NPS policies and guidelines. Plans are underway to address water-related issues for the building, but these will only partially resolve them. There is also a lack of specific knowledge and information regarding the significance of the structure, although a historic structure report is in draft form (2002). If existing management policies are continued under Alternative A, impacts to the museum would likely be moderate, long-term, and adverse.

Commemorative era structures have not been formally recognized as nationally significant. Structures such as the museum, Wick Farm outbuildings, and the thoroughly rehabilitated Guerin House could be adversely affected by continued lack of action to identify and protect these resources. However, these structures are recorded on the List of Classified Structures and are managed as cultural resources. Continuing existing management policies under Alternative A would likely have a moderate, long-term, adverse impact on commemorative structures.

There is currently no program to deal with the deposition of airborne pollutants, and the impacts of these depositions on historic structures is not known. The exposure to pollutants would be greatest

at Washington's Headquarters. The NPS does not have enough information to evaluate the duration or intensity of these potential impacts.

### **Archeology**

Numerous NPS programs are in place to preserve and protect Revolutionary War resources. However, continuing the current forest management practices that do not monitor or mitigate the effects of plant roots on archeological sites could have an adverse affect on resources in the Jockey Hollow and New Jersey Brigade units. These impacts would likely be adverse, long-term, and could range from minor to moderate in intensity.

Under Alternative A, commemorative era archeological resources would remain subject to degradation or loss due to a lack of knowledge about their location and extent. This was documented in the Integrated Cultural Resources Report (2001). The NPS may lose altogether the potential for interpreting these resources and providing the opportunity to protect them. Furthermore, the current NPS policy of "preservation in place" does not provide for interpretive opportunities and may lead the NPS to lose touch with the resource, resulting in a failure to fulfill the NPS mandate for visitor understanding. To the extent that post-encampment archeological resources remain uninvestigated, this alternative exposes these resources to illegal excavation and collecting. If existing management policies are continued under Alternative A, impacts to commemorative era archeological resources would likely be major and long-term. Because the significance of these resources has not been determined, the type of impacts (adverse or beneficial) cannot be evaluated at this time.

### **Collections**

Under Alternative A there would continue to be gradual deterioration of collection and archival materials as a result of improper storage conditions. These conditions, documented in the Collections Management Plan (2001), include excessive humidity as a result of inadequate climate controls in the museum, resulting in mold and rot. There is also the threat of actual loss of resources through water

damage or fire. There have been numerous instances where water has leaked through the roof, and fire suppression and control equipment is far below NPS standards. Similar conditions exist for collections housed in the Cross Estate basement and Wick House, as well as other scattered locations.

Alternative A, through the CMP, raises serious concerns about storage conditions and proposes several temporary improvements. But this alternative does not envision or support major changes in the way museum collections and archived materials are being stored. The continued failure to comply with NPS standards could allow further deterioration, possibly to the point of loss or impairment of some of these resources. Archival and library resources would be among the most likely affected. Impacts under Alternative A would likely be adverse, moderate–major, and long-term.

### **Cumulative Cultural Resources**

By failing to provide new or enhanced facilities, staff, and management approaches, Alternative A would likely have major, long-term, adverse impacts on cultural resources.

## **II. NATURAL RESOURCES**

### **Soils**

In general, impacts to soils would remain limited to forested areas and park trails. In Jockey Hollow, the topsoil horizon has been observed to be thinning (Russell 2001), primarily in the areas associated with invasive plant species. Elevated nitrogen levels have also been identified in areas of invasive plants. An inventory and monitoring program is needed to determine if these adverse impacts are the result of visitor use, maintenance practices, or result from invasive species or some other cause. The NPS is unable to determine the intensity or duration of the potential impacts from existing levels of public use and maintenance on soils along various trails.

### **Water Resources**

Increased erosion and sedimentation levels have been noted in park waters. Due to the fact that the park contains Primrose Brook and the headwaters of

the Passaic River, which feed the Great Swamp NWR, this is cause for concern among the NPS, FWS, and the public. There are localized, seasonally high coliform levels, but the NPS has been unable to determine causes. The USGS is commencing a project to study this issue in the park. These and other impacts to water quality may be due to deer populations, impacts from adjacent septic systems, or from lawn fertilization. The NPS currently has no policy to monitor or protect park water resources from the private development that surrounds the park. Under Alternative A, these adverse impacts may continue, and their causes may remain undetermined. Their effects would likely be moderate and long-term.

### **Biological Resources**

#### *Vegetation*

For decades, the park has practiced a policy of passive forest management or benign neglect which appears to be having an adverse impact on park resources. The absence of a specific forest management focus during the last 25 years has failed to remedy the decline of native understory plants, herbaceous plants, and native tree regeneration, especially their survival to mature sizes. These declines are attributable, at least in part, to the invasion of species such as Siebold's viburnum and Japanese barberry. The causes of these changes have not been conclusively determined, but they are likely to include deer browse, introduction of nonnative species from adjacent lands, changes in soil fertility, and large-scale climate change (Russell 2001). Changes in the forest structure and species composition have ecological consequences that are difficult to predict. However, studies indicate that the forest "could consist of vines, dead and dying trees and nonnative shrubs, not resembling in any aspect...or condition the forest at the time of the encampment" (Russell 2000). Under Alternative A, impacts could be major, long-term, and adverse.

#### *Wildlife*

As a result of the changes in the forest described above, the wildlife population is likely changing. The "no action" alternative does not envision additional studies that are needed to determine if there are

specific steps the NPS can and should take to protect wildlife. However, the park would continue to monitor specific animal populations such as deer. The park does not have enough data to establish causal relationships or evaluate the potential impacts at this time.

### **Floodplains and Wetlands**

Alternative A does not propose any actions that would affect the Passaic River floodplain. However, the changes to the forest described above may affect factors critical to wetlands. These include accelerated soil erosion, sedimentation, changes in species composition, and elevated nutrient levels in waters. Impacts are likely to be adverse and long-term, but their intensity cannot be determined at this time.

### **Species of Special Concern**

Given present policy and management, several State of New Jersey or federally listed species may be impacted. Passive management of the forest, and the steady process of forest change trending toward becoming a vine/shrub thicket, could negatively affect species such as the Indiana bat (*Myotis sodalis*), cerulean warbler (*Dendroica cerulea*), Cooper's hawk (*Accipiter cooperi*), and bald eagle (*Haliaeetus leucocephalus*) found in the area. Plant species potentially impacted include the rattlesnake plantain (*Goodyera repens*), twinleaf (*Jeffersonia diphylla*), slender pinweed (*Lechea tenuifolia*), strict blue-eyed grass (*Sisyrinchium montanum*), and oak fern (*Gymnocapium dryopteris*).

The bog turtle (*Clemmys muhlenbergii*), federally listed (threatened), and wood turtle (*Clemmys insculpta*), state listed (threatened), could be affected by unregulated human activity in wetland and riparian areas, and by the high nitrogen levels in park waters.

The NPS does not have enough information to evaluate the duration or intensity of potential impacts.

### **Air Quality**

Ozone levels, resulting from off-site activities, would remain periodically high. The NPS does

not have enough information to determine the sources, or evaluate the duration or intensity of potential impacts.

Implementation of an interpretive shuttle at Jockey Hollow could improve air quality by reducing private automobile traffic in the unit. Private cars could be prohibited on the tour road. Under Alternative A, impacts on air quality at Jockey Hollow could be moderate, long-term, and beneficial.

### **Sound**

In the Jockey Hollow, New Jersey Brigade, and Fort Nonsense units, the natural soundscape is compromised by car, truck, and airplane traffic, but the overall experience is still that of a rural forested area. Much of the noise comes from traffic off site. However, by reducing in-park traffic, implementation of an interpretive shuttle in Jockey Hollow could substantially reduce noise levels. Utilization of electric shuttle vehicles could have a moderate, beneficial, long-term impact on the natural soundscape at Jockey Hollow.

Due to the proximity of Interstate-287 to Washington's Headquarters, decibel levels are too high for visitor use and enjoyment of the historic scene and for interpretive programs. Noise and vibration levels may be adversely impacting the structural integrity of the museum and Ford Mansion. Studies are needed to determine if these impacts could impair these resources. Implementation of this alternative would not change these conditions. Impacts under Alternative A at Washington's Headquarters would likely be moderate, long-term, and adverse.

### **Cumulative Natural Resources**

The 1976 master plan did not recognize the importance of the park's natural systems. As a result, the park lacks adequate baseline data, which inhibits proper and effective resource management. Under the "no action" alternative, only limited new information would be developed to determine causes and potential solutions to existing problems. There are currently no management provisions for addressing

natural resources in the context of the larger ecosystem, such as how the park fits into regional network of wildlife corridors. The large green spaces currently act as forested islands in a larger suburban setting, and a decline in biodiversity and habitat within the park could have regional consequences. Alternative A could have moderate, long-term, adverse cumulative impacts on natural resources.

The lack of baseline information, especially in regard to natural resources, leaves the park without the ability to determine impacts and causal effects of past, present, and future actions, and restricts the ability of the NPS to properly manage the resources. This could result in deterioration of Revolutionary War features and commemorative era resources.

## **III. VISITOR EXPERIENCE**

### **Visitor Activities and Services**

Visitor activities and services would remain largely unchanged under Alternative A. Visitor experience is generally reported to be satisfactory. However, several aspects of park facilities are inadequate. Researcher space (access to the collections and archives), space for books and gifts, and outdoor group interpretive areas would remain inadequate at Washington's Headquarters. Indoor group interpretive areas and fee-collection facilities would remain inadequate at Jockey Hollow. And the park would not provide visitors the opportunity to purchase snacks on site. These conditions might result in fewer visits, shorter visits, and less opportunity for visitors to experience the park's resources. The impact on visitor experience would likely be moderate, long-term, and adverse.

Access to and circulation among the four units would continue to be confusing. This would be particularly acute for vehicles arriving at and departing from the Washington's Headquarters unit. Pedestrian access, and connections between the unit and downtown Morristown, are unsafe and can be confusing and frustrating to visitors. Orientation from the unit to Fort Nonsense and the New Jersey Brigade units is quite difficult. The main route to Jockey Hollow involves travel over a congested major

highway, and the approach to Jockey Hollow from Route 202 is becoming less rural, offering less time and distance for visitors to decompress to make an appropriate transition to the historical park. The experience of moving between units in private automobiles breaks and severely disrupts the continuity of experience in the park. Impacts on the visitor experience associated with continuing this pattern of access would be moderate to major, long-term, and adverse.

Proposed in the 1976 master plan, Alternative A could implement an interpretive shuttle in Jockey Hollow. Circulating on the tour road, the shuttle would provide an alternative method for visiting the unit. Automobile traffic and conflicts with pedestrians would be reduced, and opportunities for visitors to learn about the park would be expanded. Impacts to the visitor experience would be moderate, long-term, and beneficial.

Under Alternative A, the park would continue to prohibit bicycles from using unpaved trails. NPS Management Policies (2001) states, “designation of bicycle routes, other than on park roads and in parking areas, requires a written determination that such use is consistent with the protection of a park’s natural, cultural, scenic, and esthetic values, safety considerations, and management objectives, and will not disturb wildlife or other park resources.” Bicycle use of unpaved trails would likely have major adverse and long-term impacts on park values (such as tranquility), visitor safety (conflicts with hikers), and other park resources such as soils and vegetation. Continuing the prohibition, but allowing bicycles on park roads, would have moderate, beneficial, and long-term impacts on the visitor experience.

### **Interpretation and Education**

Under Alternative A, the park would continue to focus interpretation on the Revolutionary War period, and not address the later commemorative era, resulting in limited visitor understanding of the park and its resources. Contributions of the WANJ, the Town of Morristown, and the CCC/PWA to the

park would not be regularly shared with visitors. Additionally, efforts to interpret the nexus between park units would remain minimal. Interpretation at each unit would continue to focus on the events that occurred on site, without building a greater context for understanding the whole of the winter encampment or war. This is problematic because most visitors only visit one unit—and hence get just a portion of the Morristown story. This narrow focus would continue to limit visitor understanding of the broad scope of the Continental Army’s activities in the Morristown region, and of the important later efforts to memorialize them. The adverse impacts on visitor understanding would be major and long-term.

Interpretive devices describe the encampments in text and images, but the appearance of landscape does not convey historical conditions. This is most notable at Fort Nonsense and the brigade encampment areas in Jockey Hollow. It is difficult to understand the drama and massive scale of the encampments—that 10,000 to 12,000 soldiers occupied the area—or that the Ford Mansion was set in an agricultural landscape. Under the “no action” alternative, only minor improvements, such as repairs to existing wayside exhibits, would be made.

Existing plans do not aid visitor understanding of the potentially dramatic changes occurring to the park’s forest. Interpretation would not treat ecological issues, such as climate change, invasive species, water quality, or deer impacts. Yet, more visitors than ever are interested in the ecological functions of the park.

In 1976, the park did not envision the numbers and kinds of recreational visitors the park now faces and that there would be increasing conflicts with cars. In Alternative A, the primary theme of the park would remain military history, but the use of the park for passive recreation would continue to steadily grow. Many visitors are not principally interested in the rich cultural and historic features of the park. Existing plans do not direct or encourage the park to reach out to underserved groups.

Under Alternative A, these various shortcomings to interpretation would not be addressed, and impacts would likely be adverse, moderate, and long-term.

Furthermore, the original sequence of visitation at Washington's Headquarters from the 1930s was reversed in the mid-1970s. Visitors arrived in front of the Ford Mansion, visited the interior, and then walked downhill to the museum. At present, visitors arrive at the unit's lower parking lot and face the rear of the museum. They walk uphill through a tangle of trees, enter the museum's back door, and travel through the exhibits, emerging from the front of the museum to visit the Ford Mansion. This sequence diminishes the importance of the Ford Mansion by obscuring the subordinate relationship of the museum to the mansion. Alternative A would not change this sequence. The impact of the sequence on visitor experience would be moderate, long-term, and adverse.

Lastly, existing plans do not envision the extent or character of new residences and transportation infrastructure that has been developed adjacent to all park units. New homes, with lights and ancillary structures, and mechanical noise (from aircraft and road traffic) intrude upon the historic setting. Under Alternative A, land protection would remain limited, and new development would continue to degrade the visitor experience. The impact on visitor experience at Washington's Headquarters could be major, long-term, and adverse. Impacts at the other units would be moderate, long-term, and adverse.

### **Carrying Capacity**

Alternative A recognizes the potential for visitation to exceed the carrying capacity of the Ford Mansion, Wick House, and historic roads in Jockey Hollow, degrading the visitor experience. As a routine component of resource management the park could study carrying capacity. No actions or policies are proposed that would substantially change the type and level of visitation at the Ford Mansion or Wick House. While the intensity cannot

be determined at this time, impacts to the visitor experience are likely to be adverse and long-term. Conversely, by introducing a shuttle in Jockey Hollow, conflicts between pedestrians and automobiles could be reduced substantially. The impact on carrying capacity and visitor experience would likely be beneficial, moderate, and long-term.

### **Cumulative Visitor Experience**

Under Alternative A, the visitor experience would continue to be diminished by the narrow interpretation of the encampment; lack of interpretation of the complexity of what visitors see and experience; the difficulty of movement between units; and the lack of a cohesive or comprehensive narrative for the entire park. Current plans fail to provide visitors with an understanding of important resources, especially the significance of and threats to those that post-date the encampments. Impacts could be moderate, long-term, and adverse.

## **IV. PARK OPERATIONS**

### **Administration and Operation**

The 1976 master plan was directed toward physical development with little guidance on management or operation. Office space located in the museum is dispersed, restricts exhibit space, displaces collections, and results in competition for space among various divisions and programs. Several other structures used for park offices are in fair condition and poorly located to efficiently serve operations. Under the "no action" alternative, these conditions would continue. Adverse impacts to administrative and operational efficiency would continue to be moderate and long-term.

Existing plans, drawn before acquisition of the Cross Estate, do not recognize the need for additional personnel to manage the large complex of buildings and landscape features. The overall result is that these facilities are not maintained to NPS standards, and compliance is not done adequately or in a timely fashion. There is also an increasing reliance on volunteers, who in turn need supervision and training. Alternative A would perpetuate this

condition. Adverse impacts on administration and operation would be moderate and long-term.

The 1976 Master Plan calls for removal of park housing, but doesn't address the need for housing, or its relation to employee retention and hiring. Housing costs in the area have increased exponentially in the past 25 years, resulting in few employees being able to find suitable housing at a reasonable commuting distance from the park. In some cases, historic structures, such as the Guerin House, have been preserved through use as employee housing. Although this is generally considered a beneficial impact, it restricts their access by the public. Alternative A would not change these conditions. Adverse impacts to administration and operation would be minor and long-term.

Increased administrative duties, such as NHPA and NEPA compliance, GPRA, and PMIS result in less time to devote to visitor, staff, and collections needs. As a result, staffing and funding have lagged far short of actual needs. Under the "no action" alternative, this condition would continue. Adverse impacts would be moderate and long-term.

### **Partnerships and Outreach**

The 1976 Master Plan does not encourage partnerships beyond the WANJ, nor does it envision a regional role for the park in preserving and interpreting aspects of the American Revolution. While the park has established cooperative agreements and working relationships with other institutions, Alternative A would leave the park substantially reliant upon a single group and with a narrow focus. Additionally, the park would remain unable to provide dedicated support space for Eastern National (books and gifts) or other groups. The adverse impact on the ability of the park to accomplish its mission with assistance from partners would be moderate and long-term.

### **V. SOCIOECONOMIC ENVIRONMENT**

Alternative A would not likely bring new visitors to Morristown NHP because no new visitor facilities

would be built. This alternative would likely add 3.5 full-time-equivalent (FTE) positions. Approximately \$2.8–\$3.35 million worth of projects would be implemented over the course of implementing the GMP. This would entail some construction employment and economic spinoff in the community. Land acquisition could also have socioeconomic impacts; however, these are difficult to evaluate given market uncertainties. It should also be pointed out that there would be additional economic benefits from the salaries for new employees. In sum, the added impacts from Alternative A would be negligible (under 1%).

### **VI. IMPAIRMENT OF RESOURCES**

The park's collections and historic forest character are resources whose conservation is (a) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park, (b) key to the natural or cultural integrity of the park or to opportunities to enjoy it, and (c) identified as a goal in the park's GMP or other relevant NPS planning documents. Alternative A fails to address collections storage or the remarkable changes in the composition and character of the forest. It is conceivable that without attention in the near future, portions of the collections could deteriorate to the point of impairment. In similar fashion, the processes of forest change could convert large tracts of the Jockey Hollow and New Jersey Brigade units into landscapes of vines, dead and dying trees, and nonnative shrubs, not resembling the forest at the time of the encampment. Alternative A could impair collections, the historic forest, and violate the NPS Organic Act.

### **VII. SUSTAINABILITY AND LONG-TERM MANAGEMENT**

Numerous long-term and potentially irreversible adverse impacts may result from implementation of Alternative A.

- The lack of active forest management may result in long-term change to the forest, with the loss of critical attributes that Congress directed

the park to preserve: encampment period archeological resources and historic forest character. This irreversible change in the structure and character of the forest may result in a loss of the forest's ability to sustain itself as a mixed hardwood forest.

- Collections and archives stored under present substandard conditions would likely damage or impair critical resources.
- Continued development of private lands adjacent to the park may disturb or destroy Revolutionary War archeological resources.
- The current acreage ceiling and focus on abutting properties may not effectively protect the visitor experience, and may harm other resources, such as water quality.

## CONSEQUENCES OF ALTERNATIVE B

### Summary of Alternative B

This alternative would suggest, to the fullest extent possible, the character of the park during the encampment period of 1777–82. The park would employ interpretive methods such as programs, exhibits and other media, and extensive rehabilitation of the landscape to present to visitors a scene evocative of the period. Lost features could be replaced or reconstructed, and features introduced after the encampments could be selectively removed or de-emphasized to provide visitors the direct experience that is being sought. This alternative thus attempts to create a meaningful visitor experience through direct contact with the physical landscape conditions encountered during the military encampments.

However, it recognizes that a completely faithful restoration of those conditions is unattainable considering the limited documentation of specific historic conditions, and the intervening changes to the forest such as the demise of chestnut trees in the early 20th century. In some ways a full restoration is undesirable, considering, for example, the environ-

mental damage associated with the extensive clearcutting practiced during the encampments.

Key actions include:

- The museum is rehabilitated and a 5,000–10,000-square-foot addition is constructed to improve collections storage and exhibits. The proposed locations for the addition are either at the rear of the museum or along either side, set back from its south façade.
- A cultural landscape treatment plan integrates cultural and natural resource management objectives to protect cultural resources and historic character and to sustain the park's mixed hardwood forest.
- Interpretation centers exclusively on the encampments (*similar to Alternative A*). Landscape vignettes are created along historic road corridors in Jockey Hollow suggesting aspects of the encampments.
- A park–town shuttle is developed with partners to serve multiple units.
- The authorized acreage ceiling is adjusted upward to better facilitate land acquisition on a willing-seller basis to protect park resources.
- The park is a leader in regional initiatives related to the Revolutionary War and environmental stewardship.

Management prescriptions and possible actions under this alternative are described in detail in Chapter 2.

### I. CULTURAL RESOURCES

#### Historic Landscapes

Landscape rehabilitation to support Alternative B would temporarily disrupt the historic scene during implementation, visually, audibly, and through increased construction-related traffic. Rehabilitation would encompass approximately 5 acres of the Washington's Headquarters unit, up to 30 acres at Fort Nonsense, and up to 80 acres in corridors along

historic roads and features in Jockey Hollow. Actions would include vegetation removal, replanting, and changes to paths and trails. The resulting landscape would more closely reflect the landscape encountered by the Continental Army during the encampment period. Impacts would likely be beneficial and long-term. Impacts would be moderate rather than major because the resulting landscape would still only suggest historical conditions.

Landscape rehabilitation could entail removal or modification of features that post-date the encampments. These include ornamental plantings around the Ford Mansion, and the Wick flower garden and orchard. In most cases, the significance of these features has not been determined. All work would be done in compliance with the Secretary of the Interior's Standards for the Treatment of Historic Landscapes. The impact of these actions would be long-term, but the type and intensity cannot be evaluated at this time.

Construction of an addition to the museum would not affect the setting of the Ford Mansion. If constructed on either side of the museum, or behind (north of) the museum, the structures would not be visible from the mansion. The landscape in these areas lacks integrity to the encampment period.

Resource management actions to sustain the mixed hardwood forest would be guided by a cultural landscape treatment plan. These actions, possibly including replanting, deer exclosures, and removal of invasive plants, would protect the character of the park's forests, an important cultural resource recognized by Congress at the establishment of the park. Treatment would be limited to the areas outside the historic road corridors in Jockey Hollow and at the New Jersey Brigade unit: a total of approximately 1,500 acres. Impacts associated with these actions would be long-term, major, and beneficial.

Alternative B would seek authority to raise the park's acreage ceiling by 500 acres. A land protection plan would address acquisition of easements and lands, on a willing-seller basis, to protect park

resources from incompatible development on adjacent properties. Residential development intensifying along the park boundary already degrades the park's historic setting. Proposals are underway to introduce additional residential and commercial uses. Increasing the acreage ceiling would enable the park to quickly respond to opportunities for land acquisition, and help communicate to the local community the National Park Service's interest in acquiring adjacent lands on a willing-seller basis. The impact on historic landscapes would be major, long-term, and beneficial.

### **Structures**

The interior of the museum would be rehabilitated, both in terms of structural integrity (roof) and physical plant, and updating to current codes and NPS standards for collections storage. All work would be done in compliance with the Secretary of the Interior's Standards for the Treatment of Historic Structures and would not diminish the integrity of the building. Impacts would be beneficial, major, and long-term.

Under Alternative B, the park would construct an addition to the museum. The specific design would be developed as a continuation of Section 106 compliance. All work would be done in compliance with the Secretary of the Interior's Standards for the Treatment of Historic Structures.

Removal of the Dick House and the garage of the Caretaker's Cottage, two non-contributing structures, would have no impact on historic structures. However, the Caretaker's Cottage is also proposed for removal. The NPS would first make a determination of the significance of the structure. All work to be done on other structures listed on the park's List of Classified Structures would be done in conformance with the Secretary of the Interior's Standards for the Treatment of Historic Structures. The impact of these actions would be long-term, but the type and intensity cannot be evaluated at this time.

The lease of the principal building of the Cross Estate would specify that the structure be main-

tained in a manner so as not to diminish its eligibility for the National Register. And the NPS would evaluate the significance of the principal building. Under this condition, impacts would be negligible.

### **Archeology**

The ACHP and SHPO require review of archeological research actions under Alternative B. Potential impacts would be studied and mitigated. Otherwise, investigations to gain information for improved interpretation (the active role for archeology envisioned in Alternatives B) could consume resources, bring greater risk of vandalism in open sites, and have major, long-term adverse impacts on archeological resources. All archeological resources would be protected and preserved in accordance with NPS policies and guidelines.

This alternative proposes to implement a high level of site stabilization, particularly at the brigade cantonment areas and at Fort Nonsense, to preserve, to the maximum extent feasible, evidence of the encampment and 1777 redoubts. In new management zones, the effects of vegetation on archeological resources would be monitored and mitigated in accordance with NPS policy. These actions would have major, long-term beneficial impacts on archeological resources.

The construction of an addition to the museum in either of the proposed locations would likely have a negligible impact on archeological resources, as both of locations have been previously disturbed. Any new pathways and exhibits located outdoors would be subject to archeological investigations prior to beginning construction to ensure no disturbance of subsurface resources, as per standard NPS practices.

Numerous NPS programs are in place to preserve and protect Revolutionary War resources. However, Morristown's archeological resources that post-date the encampment are subject to degradation or loss due to a lack of knowledge about their location and extent. This was documented in the Integrated Cultural Resources Report (2001). The NPS may lose altogether the potential for interpreting these

resources and providing the opportunity to protect them. As with historic landscape features and structures, the significance of these resources has not been determined. The impact would be long-term, but the type and intensity cannot be evaluated at this time.

### **Collections**

Museum rehabilitation and construction of an addition would necessitate temporary relocation of the collections and archives. The park would take appropriate measures to protect objects during transport and storage. Impacts to the collections should be negligible.

Under Alternative B, the scope of collections would be revised and portions of the collections could be deaccessioned to fit the focus on the encampments. This action would be limited by the terms of donations which often specify they be kept at the park. This would apply to the extensive and far-ranging Lloyd W. Smith collection, among others. It is likely that impacts to the physical resources would be negligible.

Rehabilitation of the museum and construction of an addition would enable the park to move the collections and archives from substandard space, into climate-controlled, fire-safe conditions. This would dramatically reduce the rate of deterioration and the need for later conservation treatment of deteriorated objects. These actions would also provide for greater public access to the collections for research. Relocating administrative function from the museum would make additional space available for collections storage and exhibits. The beneficial impacts on preservation of collections would be major and long-term.

### **Cumulative Cultural Resources**

By providing new and enhanced facilities, staff, and management approaches, Alternative B would have major, long-term, beneficial impacts on cultural resources from the encampment period. Alternative B's focus on the encampment could also have long-term impacts on cultural resources from the commemorative era. Because the significance of resources that post-date the encampment has not been

determined, the type and intensity of impact cannot be evaluated at this time.

## **II. NATURAL RESOURCES**

### **Soils**

Similar to Alternative A, soils in forested areas and park trails could be affected under Alternative B. In Jockey Hollow, the topsoil horizon has been observed to be thinning (Russell 2001), primarily in the areas associated with invasive plant species. Elevated nitrogen levels have also been identified in areas of invasive plants. A carrying capacity study or inventory and monitoring program would be completed to determine if these adverse impacts are the result of visitor use, maintenance practices, competition from invasive species, or other causes. The study would establish appropriate use levels and maintenance practices. The NPS is unable to determine the intensity or duration of potential adverse impacts from existing levels of public use and maintenance on soils along various trails.

Construction of an addition to the museum would disturb soil resources at Washington's Headquarters. The 5,000–10,000-square-foot addition would likely have two stories, with a footprint of 2,500–5,000 square feet. The total extent of soil disturbance, including the building footprint and associated work areas, would be less than one-quarter acre. The NPS would employ erosion control measures to minimize soil loss, and all disturbed areas outside the addition would be fully landscaped. Adverse impacts to soil resources would be minor and short-term.

In addition to these impacts, the creation of historic landscape vignettes under Alternative B could potentially disturb soils in up to 5 acres at Washington's Headquarters, up to 30 acres at Fort Nonsense, and up to 80 acres in Jockey Hollow. Adverse impacts would likely be short-term and minor, as erosion would be controlled during implementation and all treated areas would be revegetated.

Resource management actions to sustain a mixed hardwood forest, potentially involving replanting,

deer exclosures, and removal of invasive plants, could impact soil resources. Adverse impacts would likely be short-term and minor, as erosion would be controlled during implementation and all treated areas would be revegetated.

### **Water Resources**

Under Alternative B, the park would address the sources of increased erosion and sedimentation levels and seasonally high coliform levels through new management approaches, including a Water Quality Protection zone, acquiring easements and lands, and other measures. Long-term adverse impacts may continue; however, they would be of negligible intensity.

In Alternative B, landscape rehabilitation to create historical landscape vignettes would potentially disturb water resources in Jockey Hollow through siltation. In a similar manner, resource management actions to sustain a mixed hardwood forest, potentially involving replanting, deer exclosures, and removal of invasive plants, could impact park waters through siltation. However, management actions within the Water Quality Protection zones would address present conditions and mitigate impacts due to proposed landscape treatment and visitor use. Mitigation in this zone could include revegetating eroded banks to control erosion and restricting visitor access to stream banks. Impacts to surface waters would likely be short-term and negligible.

### **Biological Resources**

#### *Vegetation*

Under Alternative B, a new integrated treatment plan to sustain a mixed hardwood forest would be developed through interdisciplinary research. The research to determine treatment, involving extensive inventory and monitoring, is not likely to have adverse impacts. Implementation of the plan would likely impact park vegetation. Landscape treatment would be parkwide, with particular emphasis on the Jockey Hollow and New Jersey Brigade units. The type and intensity of short-term impacts cannot be determined at this point. Over the long term,

sustaining a mixed hardwood forest would have a major beneficial impact on park vegetation.

Landscape rehabilitation to create historical landscape vignettes would likely have impacts due to the removal of trees at Washington's Headquarters, Fort Nonsense, and Jockey Hollow. Treatment could encompass up to 115 acres in three units. Treatment would employ a combination of clearing in some forested areas and reforestation in mowed fields, each based on historical research and interpretive needs. Impacts to vegetation would vary depending on the existing conditions and the treatment selected. The type and intensity of short-term impacts cannot be determined at this point. However, in the long term there would likely be no major impact or impairment to vegetation.

#### *Wildlife*

Under Alternative B, wildlife would likely be impacted due to implementation of the landscape treatment plan. The plan's actions to create historical vignettes and sustain the mixed hardwood forest could reduce habitat for certain species and increase habitat for others. Impacts would be both short and long term, but would likely be minor or moderate. Some impacts could be beneficial; however, the scope of these cannot be determined at this time.

As a result of the changes in the forest management, the wildlife population would likely change. Alternative B envisions a robust research program to determine if there are specific steps the NPS can and should take to protect wildlife. As in Alternative A, the park would continue to monitor specific animal populations such as deer. The park does not have enough data to establish causal relationships or evaluate the potential impacts at this time.

#### **Floodplains and Wetlands**

Alternative B does not propose actions that would affect the Passaic River floodplain. However, landscape treatment described above may affect factors critical to park wetlands. These include accelerated soil erosion, sedimentation, changes in species composition, and elevated nutrient levels in

waters. The Water Quality Protection zone proposed under Alternatives B and C encompasses the Passaic River floodplain and all park wetlands. While focused on protecting water quality, management actions would also protect floodplains and wetlands. Impacts would likely be avoided or minimized, and the heightened management of these areas could have a moderate, long-term, beneficial impact.

#### **Species of Special Concern**

Under Alternative B, landscape rehabilitation to create historical landscape vignettes and to sustain the mixed hardwood forest could involve clearing acres of mature trees. This could have direct, indirect, or cumulative impacts on federally or state-listed species. The Indiana bat (*Myotis sodalis*), cerulean warbler (*Dendroica cerulea*), Cooper's hawk (*Accipiter cooperi*), and bald eagle (*Haliaeetus leucocephalus*) could potentially be affected.

The U.S. Fish and Wildlife Service (FWS) would be consulted prior to implementing landscape treatment plans, and mitigation measures recommended by the FWS would be developed. For the Indiana bat, a species not recorded in the park but known to inhabit Morris County, these measures include: bat surveying, keeping the size of clearings to under 1 acre, and scheduling work for November 15 to April 1, when the bats are hibernating in areas outside the park.

Alternative B seeks to preserve wetland and riparian areas for their habitat value and as critical to maintaining high water quality. Visitor activities would be controlled in these areas, and supporting facilities would also be limited. These areas are potential habitat for the federally listed bog turtle (*Clemmys mublenbergii*), known to occur within 1.5 miles of the park, and several state-listed threatened plant species. The park would follow FWS recommendations to survey for the presence of bog turtles and other species.

By consulting with the FWS prior to implementing landscape treatment plans, and by adopting specific

recommendations, Alternative B would have negligible adverse impacts on species of special concern.

### **Air Quality**

Similar to Alternative A, ozone levels would continue to be periodically high. The NPS would not have enough information to determine the sources, or evaluate the duration or intensity of potential impacts.

Implementation of a park–town shuttle could improve air quality by reducing private automobile traffic at each unit. For example, private cars would be discouraged on the Jockey Hollow tour road. Under Alternative B, impacts on air quality could be moderate, long-term, and beneficial.

### **Sound**

In the Jockey Hollow, New Jersey Brigade, and Fort Nonsense units, the natural soundscape is compromised by car, truck, and airplane traffic, but the overall experience is still that of a rural forested area. Most of the noise comes from off-site traffic. However, landscape rehabilitation to create historical landscape vignettes, possibly using modern machinery, could temporarily increase manmade sounds. Implementing a park–town shuttle could reduce in-park traffic and substantially reduce noise levels, most notably at Jockey Hollow where there are few non-park noises. Utilization of electric shuttle vehicles could have additional beneficial impacts on the natural soundscape. The overall impact of these actions on the natural soundscape would vary among and within units and would likely be of moderate intensity.

As in Alternative A, the high decibel levels at Washington’s Headquarters would remain too high for visitor use and enjoyment of the historic scene and for interpretive programs. Noise and vibration levels may be adversely impacting the structural integrity of the museum and Ford Mansion. Studies would be completed to determine if these impacts could result in impairment of these resources. Under Alternative B, the significance of the museum would be determined and, if found eligible, could justify

intervention. Impacts at Washington’s Headquarters would likely be adverse, moderate, and long-term.

### **Cumulative Natural Resources**

The increased inventory and monitoring, and heightened management of natural resources would likely have beneficial long-term impacts. The intensity of the impacts cannot be determined at this time.

## **III. VISITOR EXPERIENCE**

### **Visitor Activities and Services**

Under Alternative B, new activities and services would be provided, and interpretation of the encampment period would be enhanced. The long-term impact of these actions would be major and beneficial. However, there would be short-term adverse impacts, as follows.

There would be temporary impacts to the visitor experience during landscape rehabilitation, particularly the creation of vignettes. Some areas could be inaccessible. However, the process of rehabilitation would be treated as an educational opportunity. Impacts would likely be short-term and negligible.

There would be short-term and minor adverse impacts during rehabilitation and expansion of the museum. Construction would introduce visual intrusions, noise, dust, vibrations, and traffic. Visitors would need to be routed around the construction area in order to visit the unit. The public would have no access to museum exhibits, and researchers would not have access to the collections or archives. Such a limited experience would result in an incomplete understanding or appreciation of the park.

Despite the short-term construction-related impacts associated with the museum rehabilitation and construction of an addition, this alternative would have a major, beneficial, and long-term impact on the visitor experience. Visitors would have greater opportunity to enjoy programs in the museum and adjacent landscape. Researchers and school groups would be better accommodated. Visitors would find a greater range of books and related gifts. New pedes-

trian links and signage from downtown Morristown to the park would enhance opportunities for visitors to include other cultural sites in their visit to Morristown, and to reach the park using public transit. The new pathways at the unit would provide better circulation through the site from visitor parking areas, and between the Ford Mansion and museum.

Rehabilitation of the Jockey Hollow visitor center would have similar short-term adverse impacts, and long-term beneficial impacts. The work would be done in such a manner so as to preserve the building's character-defining features, yet achieve greater utility in support of core programs and services.

Sustaining a mixed hardwood forest would involve persistent research and treatment in much of the forested areas of the Jockey Hollow and the New Jersey Brigade units. These actions could restrict visitors from portions of the park for long periods of time. Actions would be designed to minimize impacts on visitors through measures such as keeping treated areas modest in size, or locating experimental plots away from trails. Given the large size of the forest, and the extensive trail network, opportunities for visitors to enjoy the park would not be greatly diminished. Impacts would be adverse, but minor. Over the long term, sustaining the scenic and ecological values of the forest, both highly valued by visitors, would more than compensate for the minor impacts.

Several actions under this alternative involve changes to vehicular circulation at Jockey Hollow. Closure and restoration of road segments could result in reductions in numbers of visitors and times of visitation. Types of uses, such as private vehicles, may be restricted to certain times, or eliminated. Motorists may need to take alternate routes. Emergency access would be preserved. The objectives of these actions include enhancing the historic scene and reducing or eliminating unsafe conditions involving vehicular traffic, bicycles, and pedestrians. Unsafe conditions are particularly acute along Sugar Loaf Road. Any such actions would be done only

after the opportunity for public review of proposals and opportunity for comment.

Vehicular circulation would be improved beyond Jockey Hollow through implementation of a park-town shuttle. Running among park units, downtown Morristown, and other related regional attractions, the shuttle would have major long-term benefits to visitor safety, enjoyment, and understanding. It would reduce visitor exposure to high traffic volumes, substituting a safe and comfortable experience. The shuttle would also facilitate visitation of more than one park unit, potentially increasing visitor understanding of the significance of Morristown NHP.

As in Alternative A, the park would continue to prohibit bicycles from using unpaved trails. NPS Management Policies (2001) states, "designation of bicycle routes, other than on park roads and in parking areas, requires a written determination that such use is consistent with the protection of a park's natural, cultural, scenic, and esthetic values, safety considerations, and management objectives, and will not disturb wildlife or other park resources." Bicycle use of unpaved trails would likely have major adverse and long-term impacts on park values (such as tranquility), visitor safety (conflicts with hikers), and other park resources such as soils and vegetation. Continuing the prohibition, but allowing bicycles on park roads, would have major, beneficial, and long-term impacts on the visitor experience.

Leasing portions of the Cross Estate might reduce public access to the formal gardens and trailheads. Within the terms of the lease the park would require adequate maintenance and appropriate public access to minimize these long-term adverse impacts.

### **Interpretation and Education**

In Alternative B, historical landscape vignettes portraying aspects of the encampment in Jockey Hollow would be created to enhance interpretation. Located along the tour road corridor and at major interpretive sites such as the Pennsylvania Line, the vignettes and new waysides would be seen by the

majority of park visitors. Landscape rehabilitation at the other units would have a similar goal. Additionally, new permanent and traveling exhibits at the museum and updated waysides elsewhere would provide visitors with a better orientation to the park, and a better understanding of the events associated with the encampment period and Washington's use of the Ford Mansion. Efforts would be made to improve the arrival sequence, putting more emphasis on the Ford Mansion and interpreting the scope of the Ford Farm. Orientation and interpretation of all park themes would be provided at each unit. The park would open extensive vistas at Fort Nonsense to portray conditions extant during the encampment period. The clearing, combined with new large-scale interpretive exhibits, would give visitors a better sense of the military significance of the hilltop. The overall approach would make the conditions experienced by the Continental Army, and the broad range of their military activities during the encampments, more tangible and visible. Beneficial impacts on visitor understanding and enjoyment would be major and long-term.

As in Alternative A, under this alternative the park would continue to focus interpretation on the encampment period and not address later time periods. Potential deaccessioning could severely reduce the intellectual and research value of the collections. Contributions of the WANJ, the Town of Morristown, and the NPS/CCC/PWA to the park would not be regularly shared with visitors. The adverse impact on visitor understanding is judged to be moderate and long-term.

Interpretation of forest management activities would complement the historical focus. Connections between natural resources, such as water and a mature forest, and General Washington's selection of Jockey Hollow for the winter encampment would help visitors understand the National Park Service's investments to protect water quality and sustain the hardwood forest. Communicating the ecological functions and values of Morristown NHP would resonate with local communities that treasure the

park's open space and relatively natural setting. Impacts on visitor understanding would be major, long-term, and beneficial.

### **Carrying Capacity**

Alternative B recognizes the potential for visitation to exceed the carrying capacity of the Ford Mansion and historic roads in Jockey Hollow, and proposes actions that could affect carrying capacity. Rehabilitation of the museum would likely bring approximately 4,800 additional visitors to the unit annually. Support facilities (parking, restrooms) are generally adequate; however, wait time to visit the Ford Mansion could be slightly increased. This inconvenience would be offset substantially by new and improved exhibits in the museum and rehabilitated landscape. The impact on the visitor experience would likely be adverse, negligible, and long-term.

A second group of actions, introduction of a park–town shuttle and other restrictions on automobile traffic in Jockey Hollow, would tend to improve carrying capacity. Conflicts among visitors using different modes of travel would be substantially reduced. The impact on the visitor experience would likely be beneficial, moderate, and long-term. The park would study carrying capacity prior to implementing these actions.

### **Cumulative Visitor Experience**

Through preserving important park values, refocusing interpretation on treating the encampments in greater depth, and providing new services such as the park–town shuttle, Alternative B would have major, long-term, beneficial impacts on the visitor experience.

## **IV. PARK OPERATIONS**

### **Administration and Operation**

Impacts on park operations associated with proposed actions under Alternative B have several elements. There would be moderate, short-term, adverse impacts to park administrative staff who would have to either relocate to other facilities within the park, possibly the Cross Estate, or to an

off-site facility during rehabilitation of the museum. This temporary relocation would also result in less access for visitors to park staff, decreased staff efficiency due to increased travel time, and additional duties for maintenance personnel and protection rangers, with associated costs.

If the park acquires an existing residence adjacent to the Jockey Hollow unit to serve as administrative headquarters, there would be beneficial, minor, and long-term impacts on administrative efficiency. These would result from reduced staff travel time among units, particularly as Jockey Hollow is the most heavily visited unit. This action would likely have negligible impacts on traffic and natural resources. The roads surrounding Jockey Hollow generally have the capacity to accept the projected minor increase in traffic, and most residential properties in the area would likely have adequate facilities to support administrative functions without substantial site modification.

The removal of the Caretaker's Cottage, its garage, and the Dick House would result in staff having to relocate. If staff members move temporarily to the Cross Estate, this would result in added travel time to and from Washington's Headquarters. Curatorial staff would also experience additional burdens from having to monitor conditions at temporary, remote, and possibly multiple locations where the collections and archives would be stored during rehabilitation. The collections and archives would need to be relocated to an appropriate site, resulting in substantial additional costs, such as storage fees and administrative time to set up, move, and retrieve materials. Visitor protection rangers would also have added duties associated with monitoring construction sites and ensuring security for visitors and resources. The addition of planning and cultural resource staff would help the park care for its resources and support its greater regional participation. Park facilities following rehabilitation and expansion of the museum would be adequate to accommodate additional staff. Consolidated work areas for curatorial staff would allow for more efficient operations.

Major, beneficial, long-term impacts would result from increases in staff (4.5 full-time and 10 seasonal positions), consolidation of space, and clear resource management objectives.

Actions under Alternative B would have minor, long-term, beneficial impacts on the maintenance division. Additional staff would be secured to maintain the new spaces in the museum and relocated administrative headquarters, operate the shuttle, implement the new forest management plans, and maintain the new landscape vignettes, waysides, and trails. Reductions in paved roads, and limitations on their use, would reduce maintenance requirements in terms of personnel time and equipment. Reductions in user conflicts along major park roads would also reduce traffic incidents requiring law enforcement involvement.

Use of the Cross Estate main house by up to 10 NPS employees would be discontinued, resulting in the need for them to find alternative housing, which may be difficult given the economic conditions surrounding the park. Removing maintenance of the house and gardens from the NPS would have a beneficial impact in that park funds, materials, and staff time would be available for more significant resources and programs.

### **Partnerships and Outreach**

Alternative B encourages the park to develop partnerships beyond the WANJ, and envisions a vital regional role in preserving and interpreting aspects of the American Revolution. A major focus of partnership could be the proposed Crossroads of the American Revolution heritage area. Alternative B also supports partnership with organizations such as the Morristown Partnership (to operate the shuttle) and outreach to organizations, such as the Great Swamp Watershed Association, involved in natural resource stewardship and protection. Actions such as rehabilitation of the museum and Jockey Hollow visitor center would enable the park to provide dedicated support space for Eastern National (books and gifts) or other groups. The impact on

the ability of the park to accomplish its mission with assistance from partners would be beneficial, major, and long-term.

#### **V. SOCIOECONOMIC ENVIRONMENT**

Unlike Alternative A, the rehabilitation and expansion of the museum would attract additional visitors. Based on increases at similar historic sites, the project is estimated to generate a 15% jump in visitation, bringing 4,800 additional museum visitors. This would lead to an additional \$134,000 per year in tourism expenditures as some of those visitors would stay overnight in the local area. This alternative would also likely add 4.5 full-time-equivalent (FTE) positions and 10 seasonal positions. Under Alternative B, \$11–\$13.25 million worth of projects would be implemented over the course of implementing the GMP. This would entail some construction employment and economic spinoff in the community. Land acquisition could also have socioeconomic impacts; however, these are difficult to evaluate given market uncertainties. It should also be pointed out that there would be additional economic benefits from the salaries for new employees at Morristown NHP. These spending estimates are fairly conservative and could go higher depending on the nature of the museum programming, the shuttle, and other improvements to the visitor experience. The beneficial impacts from Alternative B would be moderate and long-term.

#### **VI. IMPAIRMENT OF RESOURCES**

Alternative B proposes a number of new approaches to preserve and interpret park resources whose conservation is (a) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park, (b) key to the natural or cultural integrity of the park or to opportunities to enjoy it, and (c) identified as a goal in the park's GMP or other relevant NPS planning documents. As such, adoption of Alternative B would not impair park resources or values and will not violate the NPS Organic Act.

#### **VII. SUSTAINABILITY AND LONG-TERM MANAGEMENT**

Several long-term and potentially irreversible adverse impacts are avoided as a result of implementing Alternative B.

- Integrated forest management intervenes in the process of forest change, avoiding the development of a shrub-vine thicket, protecting archeological resources, and sustaining the mixed hardwood forest with the structure and character valued by Congress when authorizing the park.
- Collections and archives would be stored under proper conditions in an addition to the museum. Improved storage conditions would dramatically reduce the rate of deterioration and the need for future conservation treatment, saving money and staff time.
- An increased acreage ceiling helps the park move more quickly to protect historic landscapes and Revolutionary War resources from incompatible development on adjacent lands. Other resources, such as the visitor experience and water quality, would also be protected.

In contrast, resources that post-date the encampment, particularly those from the commemorative era, would not be protected and could be removed. Resources like the Caretaker's Cottage could be lost.

#### **CONSEQUENCES OF ALTERNATIVE C: PROPOSED ACTION**

##### **Summary of Alternative C**

This is the *proposed action*. Alternative C would emphasize the encampment period; however, it would also recognize the efforts of successive generations (1873–1942) to protect, interpret, and commemorate the encampments. The park would employ interpretive methods, such as programs, exhibits, and other media, and focused rehabilitation of the landscape to present to visitors a scene evocative of the encampment period. This alterna-

tive would also preserve selected 19th- and 20th-century conditions and features added to the historic scene, and might draw on them to illustrate the important and complex history of park resources.

Key actions include:

- The museum is rehabilitated and a 5,000–10,000-square-foot addition is constructed to improve collections storage and exhibits (*same as in Alternative B*). The proposed locations for the addition are along either side of the museum, and may extend south of its south façade.
- A cultural landscape treatment plan integrates cultural and natural resource management objectives to protect cultural resources, historic character, and sustain the park's mixed hardwood forest. (*Same as in Alternative B. However, the scope of treatment is greater than in Alternative B, as landscape vignettes are not created in Jockey Hollow.*)
- Interpretation remains centered on the encampments, but treats other themes including commemoration and historic preservation.
- A park–town shuttle is developed with partners to serve multiple units. (*Same as in Alternative B.*)
- The park's authorized acreage ceiling is adjusted upward to better facilitate land acquisition on a willing-seller basis to protect park resources. (*Same as in Alternative B.*)
- The park is a leader in regional initiatives related to the Revolutionary War, its commemoration, and environmental stewardship.

Management prescriptions and possible actions under this alternative are described in detail in Chapter 2.

## **I. CULTURAL RESOURCES**

### **Historic Landscapes**

Landscape rehabilitation to support Alternative C would temporarily disrupt the historic scene on approximately 5 acres at Washington's Headquarters during implementation, visually, audibly, and

through increased construction-related traffic. Actions would include vegetation removal, replanting, and changes to sidewalks and paths. All work would be done in accordance with existing or soon-to-be-completed treatment plans and other associated studies, as well as in accordance with applicable NPS standards and guidelines. The resulting landscape would more closely reflect the commemorative landscape established in the mid-1930s. As in Alternative B, impacts would likely be beneficial, major, and long-term.

Construction of an addition to the museum under Alternative C could affect the setting of the Ford Mansion. If constructed on either side of the museum, the structures would not be visible from the mansion. However, if constructed in the area to the south of the museum, the structures would be visible from the Ford Mansion. While visible, this area is considered to be of secondary importance to the setting of the mansion, and the new structure would be designed so as not to diminish the integrity of the setting.

As in Alternative B, resource management actions to sustain the mixed hardwood forest would be guided by a cultural landscape treatment plan. These actions, possibly including replanting, deer enclosures, and removal of invasive plants, would protect the character of the park's forests, an important cultural resource recognized by Congress at the establishment of the park. Treatment under Alternative C would encompass all woodlands outside the major interpretive areas in the Fort Nonsense, Jockey Hollow, and New Jersey Brigade units: a total of approximately 1,600 acres. As in Alternative B, impacts associated with these actions would be long-term, major, and beneficial.

Like Alternative B, Alternative C would seek authority to raise the park's acreage to 500 acres. A land protection plan would address acquisition of easements and lands, on a willing-seller basis, to protect park resources from incompatible develop-

ment on adjacent properties. Residential development intensifying along the park boundary already degrades the park's historic setting. Proposals are underway to introduce additional residential and commercial uses. Increasing the acreage ceiling would enable the park to quickly respond to opportunities for land acquisition, and help communicate to the local community the National Park Service's interest in acquiring adjacent lands on a willing-seller basis. The impact on historic landscapes would be major, long-term, and beneficial.

Under Alternative C, park partners would restore and manage the Cross Estate gardens to serve as a horticultural exhibit. These volunteers would provide services unavailable from park staff. Impacts would be long-term, moderate, and beneficial.

### **Structures**

As in Alternative B, the interior of the museum would be rehabilitated, both in terms of structural integrity (roof) and physical plant, and updating to current codes and NPS standards for collections storage. All work would be done in compliance with the Secretary of the Interior's Standards for Historic Structures and would not diminish the integrity of the building.

As in Alternative B, the park would construct a 5,000–10,000-square-foot addition to the museum. However, the locations proposed are along either side of the museum (as in Alternative B) and could extend south of its south façade. On the latter site the park could consider constructing pavilions linked to the museum, in a manner sensitive to the property's 1930s commemorative design. Regardless of the site, the specific design would be developed as a continuation of Section 106 compliance, and as in Alternative B all work would be done in compliance with the Secretary of the Interior's Standards for the Treatment of Historic Structures.

Removal of the Dick House and the garage of the Caretaker's Cottage, both non-contributing structures, would have no impact on historic structures. All work on other structures listed on the park's

List of Classified Structures (Arbogast 1985) would be done in conformance with the Secretary of the Interior's Standards for the Treatment of Historic Structures.

Under this alternative, the architectural significance and National Register eligibility of the Cross Estate main building would be evaluated. The park would continue to maintain the building in accordance with its status on the List of Classified Structures. Under Alternative C, impacts would be negligible.

### **Archeology**

As in Alternative B, the ACHP and SHPO require review of archeological research actions. Potential impacts would be studied and mitigated; otherwise, investigations to gain information for improved interpretation (the active role for archeology envisioned in Alternatives C) could *consume* resources, bring greater risk of vandalism in open sites, and have major, long-term, adverse impacts on archeological resources. All archeological resources would be protected and preserved in accordance with NPS policies and guidelines.

This alternative proposes to implement a high level of site stabilization, particularly at the brigade cantonment areas and at Fort Nonsense, to preserve, to the maximum extent feasible, evidence of the encampment and 1777 redoubts. In new management zones, the effects of vegetation on archeological resources would be monitored and mitigated in accordance with NPS policy. These actions would have major, long-term, beneficial impacts on archeological resources.

The construction of an addition on either side of the museum would likely have a negligible impact on archeological resources, as both these areas have been previously disturbed. The area behind (north) the museum is relatively less disturbed, and investigations have not ruled out the possibility for encountering archeological resources related to the encampment period. This site, and any new pathways or exhibits located outdoors, would be subject to archeological investigations prior to beginning

construction to ensure no disturbance of subsurface resources, per standard NPS practices.

Under Alternative C, commemorative archeological resources would be preserved and protected alongside Revolutionary War resources. Their location and extent would be investigated, and information from such studies would be incorporated in interpretive plans. In contrast to Alternative B, these actions would have major, long-term, beneficial impacts on commemorative era resources.

### **Collections**

As in Alternative B, museum rehabilitation and construction of an addition would necessitate temporary relocation of the collections and archives. The park would take appropriate measures to protect objects during transport and storage. Impacts to the collections should be negligible.

As in Alternative B, rehabilitation of the museum and construction of an addition would enable the park to move the collections and archives from substandard space into climate-controlled, fire-safe conditions. This would dramatically reduce the rate of deterioration and the need for later conservation treatment of deteriorated objects. These actions would also provide for greater public access to the collections for research. Relocating administrative function from the museum would make additional space available for collections storage and exhibits. The beneficial impacts on preservation of collections would be major and long-term.

### **Cumulative Cultural Resources**

By providing new and enhanced facilities, staff, and management approaches, Alternative C would have major, long-term, beneficial impacts on cultural resources from the encampment period and commemorative era.

## **II. NATURAL RESOURCES**

### **Soils**

As in Alternatives A and B, impacts to soils would be limited to forested areas and park trails. In Jockey Hollow, the topsoil horizon has been observed to be

thinning (Russell 2001), primarily in the areas associated with invasive plant species. Elevated nitrogen levels have also been identified in areas of invasive plants. A carrying capacity study or inventory and monitoring program would be completed to determine if these adverse impacts are the result of visitor use, maintenance practices, competition from invasive species, or other causes. The study would establish appropriate use levels and maintenance practices. The NPS is unable to determine the potential impacts from existing levels of public use and maintenance on soils along various trails.

As in Alternative B, construction of an addition to the museum would disturb soil resources at Washington's Headquarters. The 5,000–10,000-square-foot addition would likely have two stories, with a footprint of 2,500–5,000 square feet. The total extent of soil disturbance, including the building footprint and associated work areas, would be less than one-quarter acre. The NPS would employ erosion control measures to minimize soil loss, and all disturbed areas outside the addition would be fully landscaped. Adverse impacts to soil resources would be minor and short-term.

As in Alternative B, resource management actions to sustain a mixed hardwood forest, potentially involving replanting, deer exclosures, and removal of invasive plants, could impact soil resources. Adverse impacts would likely be short-term and minor, as erosion would be controlled during implementation and all treated areas would be revegetated.

### **Water Resources**

As in Alternative B, the park would address the sources of increased erosion and sedimentation levels, and seasonally high coliform levels through new management approaches, including a Water Quality Protection zone, acquiring easements and lands, and other measures. Under Alternative C, long-term adverse impacts may continue; however, they would be of negligible intensity.

In Alternative C, resource management actions to sustain a mixed hardwood forest, potentially involv-

ing replanting, deer exclosures, and removal of invasive plants, could impact park waters through siltation. However, management actions within the Water Quality Protection zones would address present conditions and mitigate impacts due to proposed landscape treatment and visitor use. Mitigation in this zone could include revegetating eroded banks to control erosion and restricting visitor access to stream banks. Impacts to surface waters would likely be short-term and negligible.

## **Biological Resources**

### *Vegetation*

Under Alternative C, a new integrated treatment plan to sustain a mixed hardwood forest would be developed through interdisciplinary research. The research to determine treatment, involving extensive inventory and monitoring, is not likely to have adverse impacts. Implementation of the plan would likely impact park vegetation. Landscape treatment would be parkwide, with particular emphasis in the Jockey Hollow and New Jersey Brigade units. Unlike Alternative B, this alternative does not create landscape vignettes. The type and intensity of short-term impacts cannot be determined at this point. Over the long term, sustaining a mixed hardwood forest would have a major beneficial impact on park vegetation.

### *Wildlife*

Under Alternative C, wildlife would likely be impacted due to implementation of the landscape treatment plan. The plan's actions to sustain the mixed hardwood forest could reduce habitat for certain species, and increase habitat for others. Impacts would be both short- and long-term, but would likely be minor or moderate. Some impacts could be beneficial; however, the scope of these cannot be determined at this time.

As a result of the changes in the forest management, the wildlife population would likely change. Alternative C envisions a robust research program to determine if there are specific steps the NPS can and should take to protect wildlife. As in Alternative A, the park would continue to monitor specific animal populations such as deer. The park does not have

enough data to establish causal relationships or evaluate the potential impacts at this time.

## **Floodplains and Wetlands**

Like Alternative B, this alternative does not propose actions that would affect the Passaic River floodplain. However, landscape treatment described above may affect factors critical to park wetlands. These include accelerated soil erosion, sedimentation, changes in species composition, and elevated nutrient levels in waters. The Water Quality Protection zone proposed under Alternatives B and C encompasses the Passaic River floodplain and all park wetlands. While focused on protecting water quality, management actions would also protect floodplains and wetlands. Impacts would likely be avoided or minimized, and the heightened management of these areas could have a moderate, long-term, beneficial impact.

## **Species of Special Concern**

Under Alternative C, landscape treatment to sustain the mixed hardwood forest could involve the removal of several mature trees. This could have direct, indirect, or cumulative impacts on federally or state listed species. The Indiana bat (*Myotis sodalis*), cerulean warbler (*Dendroica cerulea*), Cooper's hawk (*Accipiter cooperi*), and bald eagle (*Haliaeetus leucocephalus*) could potentially be affected.

As in Alternative B, the U.S. Fish and Wildlife Service (FWS) would be consulted prior to implementing landscape treatment plans, and mitigation measures recommended by the FWS would be developed. For the Indiana bat, a species not recorded in the park but known to inhabit Morris County, these measures include: bat surveying, keeping the size of clearings to under 1 acre, and scheduling work for November 15 to April 1, when the bats are hibernating in areas outside the park.

Like Alternative B, Alternative C seeks to preserve wetland and riparian areas for their habitat value and as critical to maintaining high water quality. Visitor activities would be controlled in these areas, and supporting facilities would also be limited. These

areas are potential habitat for the federally listed bog turtle (*Clemmys mublenbergii*), known to occur within 1.5 miles of the park, and several state-listed threatened plant species. The park would follow FWS recommendations to survey for the presence of bog turtles and other species.

By consulting with the FWS prior to implementing landscape treatment plans, and by adopting specific recommendations, Alternative C would have negligible adverse impacts on species of special concern.

### **Air Quality**

Similar to Alternatives A and B, ozone levels would continue to be periodically high. The NPS would not have enough information to determine the sources, or evaluate the duration or intensity of potential impacts.

Implementation of a park–town shuttle could improve air quality by reducing private automobile traffic at each unit. For example, private cars would be discouraged on the Jockey Hollow tour road. Under Alternative C, impacts on air quality could be moderate, long-term, and beneficial.

### **Sound**

In the Jockey Hollow, New Jersey Brigade, and Fort Nonsense units, the natural soundscape is compromised by car, truck, and airplane traffic, but the overall experience is still that of a rural forested area. Most of the noise comes from off-site traffic. Implementing a park–town shuttle could reduce in-park traffic and substantially reduce noise levels, most notably at Jockey Hollow where there are few non-park noises. Utilization of electric shuttle vehicles could have additional beneficial impacts on the natural soundscape. The overall impact of these actions on the natural soundscape would vary among and within units, and would likely be of moderate intensity.

As in Alternatives A and B, the high decibel levels at Washington’s Headquarters would continue to diminish the visitor experience and restrict interpretive programs. Noise and vibration levels may be

adversely impacting the structural integrity of the museum and Ford Mansion. Studies would be completed to determine if these impacts could result in impairment of these resources. Under Alternative C, the significance of the museum would be determined and if found eligible, could justify intervention. If the museum addition created a courtyard similar to the space envisioned in the 1930s, the building wings would substantially reduce noise and improve conditions for visitation. With this mitigating factor, overall impacts at Washington’s Headquarters would likely be adverse, minor, and long-term.

### **Cumulative Natural Resources**

The increased inventory and monitoring, and heightened management of natural resources would likely have beneficial long-term impacts. The intensity of the impacts cannot be determined at this time.

## **III. VISITOR EXPERIENCE**

### **Visitor Activities and Services**

Like Alternative B, Alternative C would provide for new activities and services, and interpretation of the encampment period would be enhanced. Interpretation would be expanded to treat a commemorative theme. The long-term impact of these actions would be major and beneficial. However, there would be short-term adverse impacts as follows.

There would be short-term and minor adverse impacts during rehabilitation and expansion of the museum. Construction would introduce visual intrusions, noise, dust, vibrations, and traffic. Visitors would need to be routed around the construction area in order to visit the unit. The public would have no access to museum exhibits, and researchers would not have access to the collections or archives. Such a limited experience would result in an incomplete understanding or appreciation of the park.

Despite the short-term construction-related impacts associated with the museum rehabilitation and construction of an addition, this alternative would have major, beneficial, and long-term impacts on the visitor experience. Visitors would have greater

opportunity to enjoy programs in the museum and adjacent landscape. Researchers and school groups would be better accommodated. Visitors would find a greater range of books and related gifts. New pedestrian links and signage from downtown Morristown to the park would enhance opportunities for visitors to include other cultural sites in their visit to Morristown, and to reach the park using public transit. The new pathways at the unit would provide better circulation through the site from visitor parking areas, and between the Ford Mansion and museum.

Rehabilitation of the Jockey Hollow visitor center would have similar short-term adverse impacts, and long-term beneficial impacts. The work would be done in such a manner so as to preserve the building's character-defining features, yet achieve greater utility in support of core programs and services.

Sustaining a mixed hardwood forest would involve persistent research and treatment in much of the forested areas of Fort Nonsense, Jockey Hollow, and the New Jersey Brigade units. These actions could restrict visitors from portions of the park for long periods of time. Actions would be designed to minimize impacts on visitors through measures such as keeping treated areas modest in size, or locating experimental plots away from trails. Given the large size of the forest, and the extensive trail network, opportunities for visitors to enjoy the park would not be greatly diminished. Impacts would be adverse, but minor. Over the long term, sustaining the scenic and ecological values of the forest, both highly valued by visitors, would more than compensate for the minor impacts.

As in Alternative B, several actions under this alternative involve changes to vehicular circulation at Jockey Hollow. Closure and restoration of road segments could result in reductions in numbers of visitors and times of visitation. Types of uses, such as private vehicles, may be restricted to certain times, or eliminated. Motorists may need to take alternate routes. Emergency access would be preserved. The objectives of these actions include enhancing the

historic scene and reducing or eliminating unsafe conditions involving vehicular traffic, bicycles, and pedestrians. Unsafe conditions are particularly acute along Sugar Loaf Road. Any such actions would be done only after the opportunity for public review of proposals and opportunity for comment.

Vehicular circulation would be improved beyond Jockey Hollow through implementation of a park-town shuttle. Running among park units, downtown Morristown, and other related regional attractions, the shuttle would have major long-term benefits to visitor safety, enjoyment, and understanding. It would reduce visitor exposure to high traffic volumes, substituting a safe and comfortable experience. The shuttle would also facilitate visitation of more than one park unit, potentially increasing visitor understanding of the significance of Morristown NHP.

As in Alternatives A and B, the park would continue to prohibit bicycles from using unpaved trails. NPS Management Policies (2001) states, "the designation of bicycle routes, other than on park roads and in parking areas, requires a written determination that such use is consistent with the protection of a park's natural, cultural, scenic, and esthetic values, safety considerations, and management objectives, and will not disturb wildlife or other park resources." Bicycle use of unpaved trails would likely have major adverse and long-term impacts on park values (such as tranquility), visitor safety (conflicts with hikers), and other park resources such as soils and vegetation. Continuing the prohibition, but allowing bicycles on park roads, would have major, beneficial, and long-term impacts on the visitor experience.

### **Interpretation and Education**

Interpretive actions are similar to those of Alternative B with the exception that Alternative C involves less landscape rehabilitation (no vignettes), more extensive interpretive exhibits, and encompasses commemorative themes. As in Alternative B, orientation and interpretation of all park themes would be provided at each unit to the extent feasible.

Landscape rehabilitation at all units would have a consistent goal. New permanent and traveling exhibits at the museum and updated waysides elsewhere would provide visitors with a better orientation to the park, a better understanding of the encampment period and Washington's use of the Ford Mansion, and later efforts to commemorate these events. Efforts would be made to improve the arrival sequence, putting more emphasis on the Ford Mansion. The park would open less expansive vistas at Fort Nonsense than under Alternative B. These clearings would be combined with new large-scale interpretive exhibits, as under Alternative B; however, the intent would be to interpret the 1777 redoubts and later commemorative efforts. Expanding and upgrading services at Fort Nonsense would cause typical short-term construction impacts. The actions would enable access to school groups and better accommodate use of the unit for picnics. The overall approach enhances visitor understanding of the conditions experienced by the Continental Army, the broad range of their military activities during the encampments, and later commemorative efforts of groups such as the WANJ, the Town of Morristown, and the NPS. Beneficial impacts on would be major and long-term.

Interpretation of forest management activities would complement the historical focus. Connections between natural resources, such as water, and General Washington's selection of Jockey Hollow for the winter encampment would help visitors understand the National Park Service's investments to protect water quality and sustain the hardwood forest. Communicating the ecological functions and values of Morristown NHP would resonate with local communities that treasure the park's open space and relatively natural setting. Impacts on visitor understanding would be major, long-term, and beneficial.

Under Alternative C, a modest interpretive exhibit would be developed to tell the story of the Crosses' involvement in the park, the development of the garden, and the Park Service's acquisition of the estate. Impacts on visitor experience would be beneficial, moderate, and long-term.

### **Carrying Capacity**

Like Alternative B, this alternative recognizes the potential for visitation to exceed the carrying capacity of the Ford Mansion and historic roads in Jockey Hollow, and proposes actions that could affect carrying capacity. Rehabilitation of the museum would likely bring approximately 4,800 additional visitors to the unit annually. Support facilities (parking, restrooms) are generally adequate; however, wait time to visit the Ford Mansion could be slightly increased. This inconvenience would be offset substantially by new and improved exhibits in the museum and rehabilitated landscape. The impact on the visitor experience would likely be adverse, negligible, and long-term.

A second group of actions, introduction of a park–town shuttle and other reductions of automobile traffic in Jockey Hollow, would tend to improve carrying capacity. Conflicts among visitors using different modes of travel would be substantially reduced. The impact on the visitor experience would likely be beneficial, moderate, and long-term. The park would study carrying capacity prior to implementing these actions.

### **Cumulative Visitor Experience**

Through preserving important park values, refocusing interpretation on treating the encampments in greater depth while expanding interpretation to encompass commemorative themes, and providing new services such as the park–town shuttle, Alternative C would have major, long-term, beneficial impacts on the visitor experience.

## **IV. PARK OPERATIONS**

### **Administration and Operation**

As in Alternative B, impacts on park operations associated with proposed actions under Alternative C have several elements. There would be moderate, short-term impacts to park administrative staff who would have to either relocate to other facilities within the park, possibly the Cross Estate, or to an off-site facility during rehabilitation of the museum. This temporary relocation would also result in less access for visitors to park staff, decreased staff

efficiency due to increased travel time, and additional duties for maintenance personnel and protection rangers, with associated costs.

If the park acquires an existing residence adjacent to the Jockey Hollow unit to serve as administrative headquarters there would be beneficial, minor, and long-term impacts on administrative efficiency. These would result from reduced staff travel time among units, particularly as Jockey Hollow is the most heavily visited unit. This action would likely have negligible impacts on traffic and natural resources. The roads surrounding Jockey Hollow generally have the capacity to accept the projected minor increase in traffic, and most residential properties in the area would likely have adequate facilities to support administrative functions without substantial site modification.

The removal of the garage for the Caretaker's Cottage would have a negligible impact on park operations. However, removal of the Dick House would result in staff members having to relocate. If staff members move to the Cross Estate, either temporarily or for a longer duration, this could result in relocation of park employees currently housed there, as well as added travel time to and from Washington's Headquarters. Curatorial staff would also experience additional burdens from having to monitor conditions at temporary, remote, and possibly multiple locations where the collections and archives would be stored during rehabilitation. The collections and archives would need to be relocated to an appropriate site, resulting in substantial additional costs such as storage fees and administrative time to set up, move, and retrieve materials. Visitor protection rangers would also have added duties associated with monitoring construction sites and the increased visitation at Fort Nonsense. The addition of planning and cultural resource staff would help the park care for its resources and support its greater regional participation. Park facilities, following rehabilitation and expansion of the museum, would be adequate to accommodate additional staff. Consolidated work areas for curato-

rial staff would allow for more efficient operations. Major, beneficial, long-term impacts would result from increases in staff (6.5 full-time and 5 seasonal positions), consolidated space, and clear resource management objectives.

Actions under Alternative C would have minor, long-term, beneficial impacts on the maintenance division. As in Alternative B, additional staff would be required to maintain the new spaces in the museum, relocated administrative headquarters, operate the shuttle, implement the new forest management plans, and maintain the new waysides and trails. Reductions in paved roads and limitations on their use would reduce maintenance requirements in terms of personnel time and equipment. Reductions in user conflicts along major park roads would also reduce traffic incidents requiring law enforcement involvement. Unlike Alternative B, however, this alternative would require the park to continue to maintain the Cross Estate with no new staff.

### **Partnerships and Outreach**

Alternative C, like Alternative B, encourages the park to develop partnerships beyond the WANJ, and envisions a vital regional role in preserving and interpreting aspects of the American Revolution. A major focus of partnership could be the proposed Crossroads of the American Revolution heritage area. The alternative also supports partnership with organizations such as the Morristown Partnership (to operate the shuttle) and outreach to organizations, such as the Great Swamp Watershed Association, involved in natural resource stewardship and protection. Unlike Alternative B, under Alternative C the park would be encouraged to collaborate on the development of a regional orientation center to help visitors understand the park's role in the rich heritage of the Morristown region. Furthermore, actions such as rehabilitation of the museum and Jockey Hollow visitor center would enable the park to provide dedicated support space for Eastern National (books and gifts) or other groups. The impact on the ability of the park to accomplish its mission with assistance from partners would be beneficial, major, and long-term.

## **V. SOCIOECONOMIC ENVIRONMENT**

As in Alternative B, the rehabilitation and expansion of the museum would attract additional visitors. Based on increases at similar historic sites, the project is estimated to generate a 15% jump in visitation, bringing 4,800 additional museum visitors. This would lead to an additional \$134,000 per year in tourism expenditures as some of those visitors would stay overnight in the local area. Alternative C would also likely add 6.5 full-time-equivalent (FTE) positions and 5 seasonal positions to the staff. Approximately \$10–\$12 million worth of projects would be implemented over the course of implementing the GMP. This would entail some construction employment and economic spinoff in the community. Land acquisition could also have socioeconomic impacts; however, these are difficult to evaluate given market uncertainties. It should also be pointed out that there would be additional economic benefits from the salaries for new employees at Morristown NHP. These spending estimates are fairly conservative and could go higher depending on the nature of the museum programming, the shuttle, and other improvements to the visitor experience. As in Alternative B, the beneficial impacts from Alternative C would be moderate and long-term.

## **VI. IMPAIRMENT OF RESOURCES**

Alternative C proposes a number of new approaches to preserve and interpret park resources whose conservation is (a) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park, (b) key to the natural or cultural integrity of the park or to opportunities to enjoy it, and (c) identified as a goal in the park's GMP or other relevant NPS planning documents. As such, adoption of Alternative C would not impair park resources or values and will not violate the NPS Organic Act.

## **VII. SUSTAINABILITY AND LONG-TERM MANAGEMENT**

As in Alternative B, several long-term and potentially irreversible adverse impacts are avoided as a result of implementing Alternative C.

- Integrated forest management intervenes in the process of forest change, avoiding the development of a shrub-vine thicket, protecting archeological resources, and sustaining the mixed hardwood forest with the structure and character valued by Congress when authorizing the park. Prospects for sustaining the forest would be slightly greater under this alternative than in Alternative B. This would be due to sustainable treatment of the 80 acres located in the core of Jockey Hollow that otherwise would be manipulated to create vignettes in Alternative B.
- Collections and archives would be stored under proper conditions in an addition to the museum. Improved storage conditions would dramatically reduce the rate of deterioration and the need for future conservation treatment, saving money and staff time.
- An increased acreage ceiling helps the park move more quickly to protect historic landscapes and Revolutionary War resources from incompatible development on adjacent lands. Other resources, such as the visitor experience and water quality, would also be protected.
- Commemorative resources would be protected and interpreted to visitors.

## Summary of Impacts by Alternative

Cultural Resources
<p><b>Landscapes</b></p> <p><i>Alternative A:</i> Adverse, Moderate–Major, Long-term (loss of commemorative resources; ineffective forest management; restrictive acreage ceiling)</p> <p><i>Alternative B:</i> Adverse, Minor, Short-term (landscape and museum rehabilitation)</p> <p>Beneficial, Major, Long-term (landscape and museum rehabilitation; increased acreage ceiling; integrated forest management)</p> <p>Undetermined type, Undetermined intensity, Long-term (possible removal of commemorative resources)</p> <p><i>Alternative C (proposed action):</i> Adverse, Minor, Short-term (landscape and museum rehabilitation)</p> <p>Beneficial, Major, Long-term (landscape and museum rehabilitation; increased acreage ceiling; integrated forest management)</p>
<p><b>Structures</b></p> <p><i>Alternative A:</i> Adverse, Moderate, Long-term (degradation of museum; loss of commemorative resources)</p> <p><i>Alternative B:</i> Beneficial, Major, Long-term (museum rehabilitation)</p> <p>Undetermined type, Undetermined intensity, Long-term (removal of Caretaker’s Cottage and other structures)</p> <p><i>Alternative C (proposed action):</i> Beneficial, Major, Long-term (museum rehabilitation)</p>
<p><b>Archeology</b></p> <p><i>Alternative A:</i> Adverse, Minor–Moderate, Long-term (degradation due to limited forest management)</p> <p>Undetermined type, Major, Long-term (loss of commemorative resources)</p> <p><i>Alternative B:</i> Beneficial, Major, Long-term (increased stabilization)</p> <p>Undetermined type, Undetermined intensity, Long-term (loss of commemorative resources)</p> <p><i>Alternative C (proposed action):</i> Beneficial, Major, Long-term (increased stabilization)</p>
<p><b>Collections</b></p> <p><i>Alternative A:</i> Adverse, Major, Long-term (storage conditions)</p> <p><i>Alternative B:</i> Beneficial, Major, Long-term (museum rehabilitation)</p> <p><i>Alternative C (proposed action):</i> Same as Alternative B</p>
<p><b>Cumulative</b></p> <p><i>Alternative A:</i> Adverse, Moderate–Major, Long-term</p> <p><i>Alternative B:</i> Beneficial, Major, Long-term</p> <p>Undetermined type, Undetermined intensity, Long-term (loss of commemorative resources)</p> <p><i>Alternative C (proposed action):</i> Beneficial, Major, Long-term</p>

## Summary of Impacts by Alternative

<p><b>Natural Resources</b></p>
<p><b>Soil</b>  <i>Alternative A:</i> Adverse, Undetermined intensity, Undetermined duration (visitor use of trails)  <i>Alternative B:</i> Adverse, Undetermined intensity, Undetermined duration (visitor use of trails)            Adverse, Minor, Short-term (museum and landscape rehabilitation, forest management)  <i>Alternative C (proposed action):</i> Same as Alternative B</p>
<p><b>Water</b>  <i>Alternative A:</i> Adverse, Major, Long-term (ineffective forest management)  <i>Alternative B:</i> Adverse, Negligible, Short- and Long-term (resource protection in special management zone)  <i>Alternative C (proposed action):</i> Same as Alternative B</p>
<p><b>Vegetation</b>  <i>Alternative A:</i> Undetermined type, Undetermined intensity, Undetermined duration (forest change)  <i>Alternative B:</i> Beneficial, Major, Long-term (landscape rehabilitation; forest management)            Undetermined type, Negligible–Moderate, Short-term (creation of vignettes; forest management)  <i>Alternative C (proposed action):</i> Beneficial, Major, Long-term (landscape rehabilitation; forest management)</p>
<p><b>Wildlife</b>  <i>Alternative A:</i> Adverse, Major, Long-term (storage conditions)  <i>Alternative B:</i> Undetermined type, Minor–Moderate, Short- and Long-term (landscape rehabilitation; forest management; creation of vignettes)  <i>Alternative C (proposed action):</i> Undetermined type, Minor–Moderate, Short- and Long-term (landscape rehabilitation; forest management)</p>
<p><b>Floodplains and Wetlands</b>  <i>Alternative A:</i> Adverse, Undetermined intensity, Long-term (forest change)  <i>Alternative B:</i> Beneficial, Moderate, Long-term (resource protection in special management zone)            Undetermined type, Undetermined intensity, Long-term (loss of commemorative resources)  <i>Alternative C (proposed action):</i> Same as Alternative B</p>
<p><b>Species of Special Concern</b>  <i>Alternative A:</i> Adverse, Undetermined intensity, Undetermined duration (forest change)  <i>Alternative B:</i> Adverse, Negligible, Short- and Long-term (landscape rehabilitation; forest management; creation of vignettes)  <i>Alternative C (proposed action):</i> Adverse, Negligible, Short- and Long-term (landscape rehabilitation; forest management)</p>
<p><b>Air Quality</b>  <i>Alternative A:</i> Beneficial, Moderate, Long-term (interpretive shuttle)  <i>Alternative B:</i> Beneficial, Moderate, Long-term (park–town shuttle)  <i>Alternative C (proposed action):</i> Same as Alternative B</p>
<p><b>Sound</b>  <i>Alternative A:</i> Adverse, Moderate, Long-term (I-287)  <i>Alternative B:</i> Adverse, Moderate, Long-term (I-287)            Beneficial, Moderate, Long-term (park–town shuttle)  <i>Alternative C (proposed action):</i> Same as Alternative B</p>
<p><b>Cumulative</b>  <i>Alternative A:</i> Adverse, Moderate, Long-term  <i>Alternative B:</i> Beneficial, Undetermined intensity, Short- and Long-term  <i>Alternative C (proposed action):</i> Same as Alternative B</p>

## Summary of Impacts by Alternative

<p><b>Visitor Experience</b></p> <p><b>Visitor Activities and Services</b>  <i>Alternative A:</i> Adverse, Moderate, Long-term (inadequate facilities; confusing circulation among units) and Beneficial, Moderate–Major, Long-term (interpretive shuttle; bicycles only on paved roads)  <i>Alternative B:</i> Adverse, Minor, Short-term (landscape rehabilitation; museum rehabilitation; forest management) Beneficial, Major, Long-term (landscape rehabilitation; museum rehabilitation; forest management; park–town shuttle and other circulation improvements)  <i>Alternative C (proposed action):</i> Same as Alternative B</p>
<p><b>Interpretation and Education</b>  <i>Alternative A:</i> Adverse, Minor–Moderate, Long-term (narrow interpretive focus; no ecological information; poor circulation; intrusive adjacent development)  <i>Alternative B:</i> Beneficial, Major, Long-term (improved orientation, treatment of ecological themes, new vignettes and other exhibits)  Adverse, Moderate, Long-term (no treatment of commemorative themes)  <i>Alternative C (proposed action):</i> Beneficial, Major, Long-term (improved orientation, treatment of ecological and commemorative themes, and new exhibits)</p>
<p><b>Carrying Capacity</b>  <i>Alternative A:</i> Adverse, Undetermined intensity, Long-term (“no action” at Ford Mansion)  Beneficial, Moderate, Long-term (JH shuttle reduces pedestrian–auto conflicts)  <i>Alternative B:</i> Adverse, Negligible, Long-term (longer wait to visit Ford Mansion)  Beneficial, Moderate, Long-term (park–town shuttle reduces pedestrian–auto conflicts)  <i>Alternative C (proposed action):</i> Same as Alternative B</p>
<p><b>Cumulative</b>  <i>Alternative A:</i> Adverse, Moderate, Long-term  <i>Alternative B:</i> Beneficial, Major, Long-term  <i>Alternative C (proposed action):</i> Same as Alternative B</p>

<p><b>Park Operations</b></p> <p><b>Administration and Operation</b>  <i>Alternative A:</i> Adverse, Minor–Moderate, Long-term (inefficient administrative space; no direction for Cross Estate; reduced housing)  <i>Alternative B:</i> Adverse, Moderate, Short-term (disruptions from rehabilitation) Beneficial, Major, Long-term (additional staff, consolidated space, and clear resource management objectives)  <i>Alternative C (proposed action):</i> Same as Alternative B</p>
<p><b>Partnerships and Outreach</b>  <i>Alternative A:</i> Adverse, Moderate, Long-term (restrictive scope)  <i>Alternative B:</i> Beneficial, Moderate, Long-term (greater scope and assistance with mission)  <i>Alternative C (proposed action):</i> Beneficial, Major, Long-term (greater scope and assistance with mission that includes commemoration)</p>

## Summary of Impacts by Alternative

### Socioeconomic

*Alternative A:* Negligible (limited new staff and projects)

*Alternative B:* Beneficial, Moderate, Long-term (increased visitation, staff and projects)

*Alternative C (proposed action):* Same as Alternative B

### Impairment

*Alternative A:* Yes: Collections and historic forest character could be impaired

*Alternative B:* No

*Alternative C (proposed action):* Same as Alternative B

### Sustainability

*Alternative A:* Adverse: - Inadequate collections storage facilities - Changing forest character - Development destroys resources on adjacent lands - Development on adjacent lands harms park values and resources

*Alternative B:* Beneficial: - Proper collections storage facility - Archeological resources stabilized - Historic forest character sustained - Development addressed with land protection plan and increased acreage ceiling

*Alternative C (proposed action):* Same as Alternative B